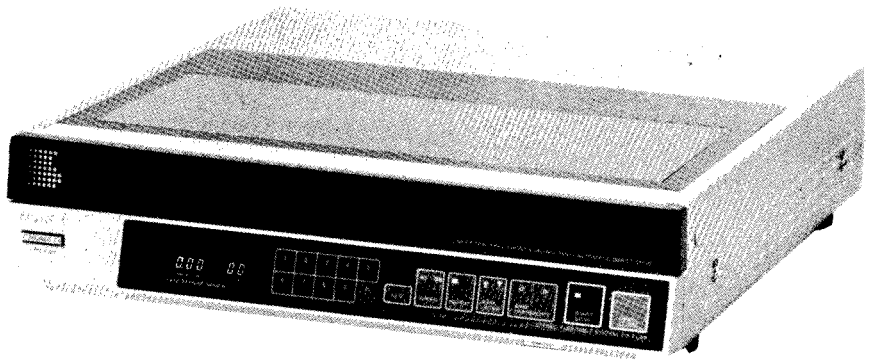
PS-FL99

SERVICE MANUAL

AEP Model
UK Model
E Model



SPECIFICATIONS

Turntable

Platter	29 cm (11 1/2 in.), aluminum-alloy diecast
Motor	Linear torque BSL (brushless and slotless) motor
Drive system	Direct drive
Control system	FG servo control system
Speed	33 1/3 rpm, 45 rpm
Wow and flutter	0.03% (WRMS)*, 0.035% (WRMS)
Signal-to-noise ratio	75 dB (DIN-B)
Automatic system	Loading, lead-in, return, reject, repeat, tonearm up/down, record size detection, RMS, AMS

Tonearm

Type	linear tracking tonearm
Pivot-to-stylus length	75 mm (3 in.)
Overall arm length	170 mm (7 1/8 in.)
Tracking error	±0.1°
Tracking force adjustment range	1.25 ±0.25 g
Cartridge	plug-in type, 6 g

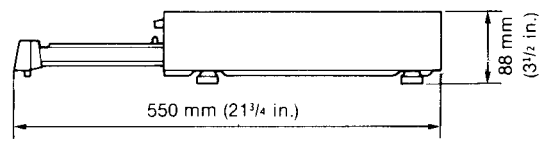
Cartridge XL-250G

Type	Moving magnet type
Frequency response	10 Hz to 20,000 Hz
Channel separation	23 dB at 1 kHz
Output voltage	5 mV at 1 kHz, 5 cm/sec.,45°
Load impedance	50 to 100 kilohms
Tracking force	1.0 to 1.5 g (1.25 g recommended)
Stylus	Sony ND-250G
Weight	6 g

* This new measuring method concerns only the turntable assembly, including the platter. It excludes wow and flutter caused by the tonearm, the cartridge, or the record. Measured by obtaining signal from magnetic pick-up head.

General

Power requirements	AEP model: 220 V ac UK model: 240 V ac E model: 110–120 or 220–240 V ac adjustable 50/60 Hz
Power consumption	15 W
Dimensions	Approx. 355 × 88 × 380 mm (w/h/d) (14 × 3 1/2 × 15 in.) including projecting parts and controls



Weight	Approx. 7 kg (15 lbs 7 oz), net Approx. 8.3 kg (40 lbs 6 oz), in shipping carton

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY SHADING AND MARK ⚠ ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

MICROFILM

STEREO TURNTABLE SYSTEM

SONY®

AUD

FEATURES

Unique modular turntable system
When you touch the OPEN/CLOSE key the turntable module will smoothly slide out. Other audio components can be positioned on top of the turntable cabinet.

Servo-controlled linear tracking tonearm
A linear tracking tonearm is designed to duplicate the movement of the head which cuts the record master.
Compared with a pivoted tonearm, a linear tracking arm has a very small tracking error (which means greatly reduced harmonic distortion) and almost no pressure on the inside wall of the groove (which means improved tracking ability and channel separation).

Programmed play
The RMS (Random Music Sensor), AMS (Automatic Music Sensor) and skip function allow you to program record play as you like.
RMS : for playing the selections on one side of the record in a desired sequence.
AMS : for starting record play from the desired selection.
Skip function : for skipping selections to the desired selection.

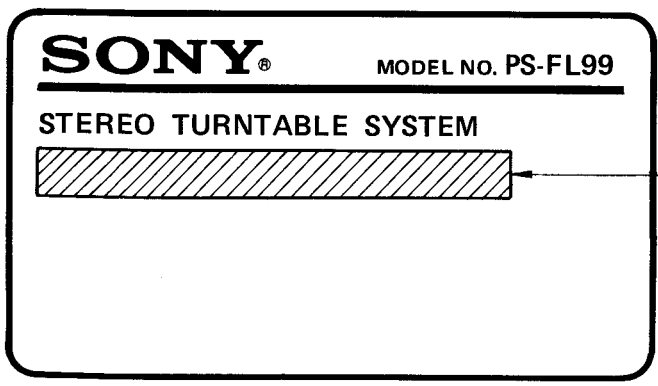
A microcomputer controls three motors
The movement of the turntable, the tonearm and the turntable module is controlled by a microcomputer. When you press the START/STOP key, the module will close, the turntable will rotate and the tonearm will lower onto the record.

Fully automatic system
With the module closed, automatic record play and tonearm up/down are operated by the "feather-touch" function keys on the front panel. The record size is automatically set by a photo-sensor system. If no record is on the turntable, the tonearm will not descend but will automatically return to the arm rest. A muting system activates when the tonearm is lifted and deactivates after the tonearm lowers onto a record so there is no need to turn the amplifier volume down every time a stylus is placed on a record.

Linear torque BSL motor
Direct drive system with Sony's unique BSL (brushless and slotless) motor which has an extremely low noise level and whose smoothness virtually eliminates wow and flutter. Its high torque assures a quick start to $33^{1}/_{3}$ rpm after only a half revolution.

Synchronized operation with the Sony cassette decks
When the tonearm lowers onto the lead-in groove of a record, the cassette deck stand-by mode is released and the record mode assumed.
When play finishes, the cassette deck is automatically set first in the record muting mode, then in the pause mode. This synchronized operation is possible with Sony cassette decks equipped with a four-pin remote control jack which is connected with the Sony RM-65 synchro remote control unit.

Wireless remote control operation
Using the optional ST-V7/V7L system control tuner, various operations—power on/off, start/stop play, tonearm up/down—can be remotely controlled.



AEP model: 220 V 50/60 Hz 15 W
UK model: 240 V 50/60 Hz 15 W
E model: 110–120 V, 220–240 V 50/60 Hz 15 W

NOTES ON REPAIR

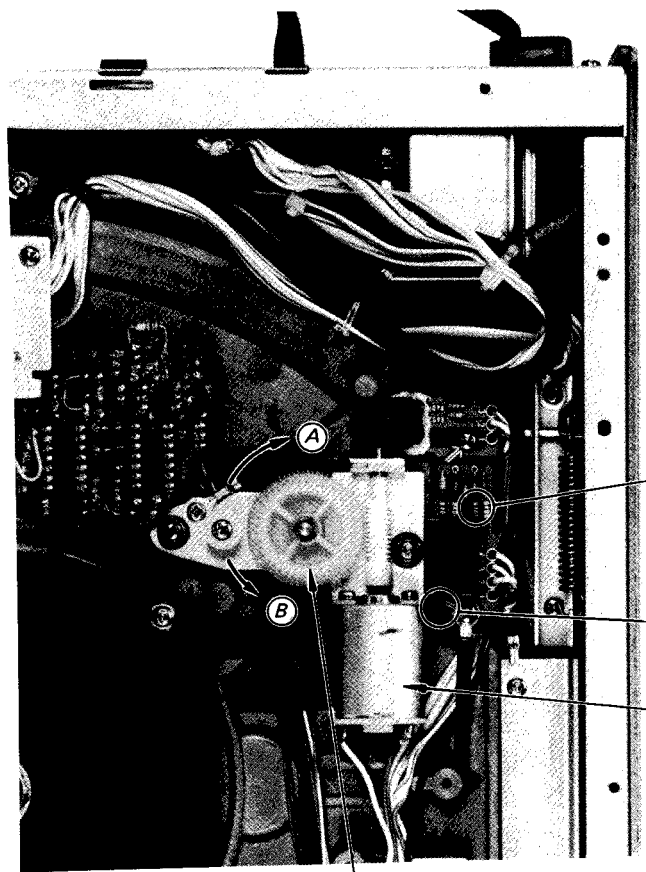
- In this set, the voltage is applied to the power supplying line (±21 V) even if the POWER switch is turned OFF. When repairing the unit, unplug the power cord with the POWER switch ON (to discharge electrolytic capacitor in the power supply circuit).

— When removing the bottom plate —

- When the module closes, the photo detector searches over the record to detect the record size (30 cm, 25 cm or 17 cm) and sense how many selections are on the record by detecting the blank spaces between selections, and then this model is ready for AUTO play. Therefore, when removing bottom plate, record size and the number of selections can not be detected because of mechanical reasons and there will be no operations even if the START / STOP button is pressed. Perform MANUAL play with ARM TRANSPORT (◁ , ▷), ARM LIFTER (▼ / ▼) button in order to check the boards.

- When POWER switch (S1) turns ON with bottom plate removed, loading motor (M901) continues to rotate and does not stop. But, it is not broken.

1. When POWER switch (S1) turns ON with TABLE END switch (S3 or S4) pressed, loading motor (M901) does not rotate.
2. When TABLE END switch (S3 or S4) is pressed according to the rotating direction of loading motor (M901), the motor stops even if the motor is rotating (See the figure below).
3. System control IC checks the condition of TABLE END switch by pressing ARM TRANSPORT (◁, ▷), ARM LIFTER (▼, ▼), START/STOP button.
   When operation buttons are pressed, be sure to keep TABLE END switch (S3 or S4) pressed. If not, key input can not be found.



When worm wheel (A) is rotating in the direction of (B), press S4 (close end det).

When worm wheel (A) is rotating in the direction of (A), press S3 (open end det).

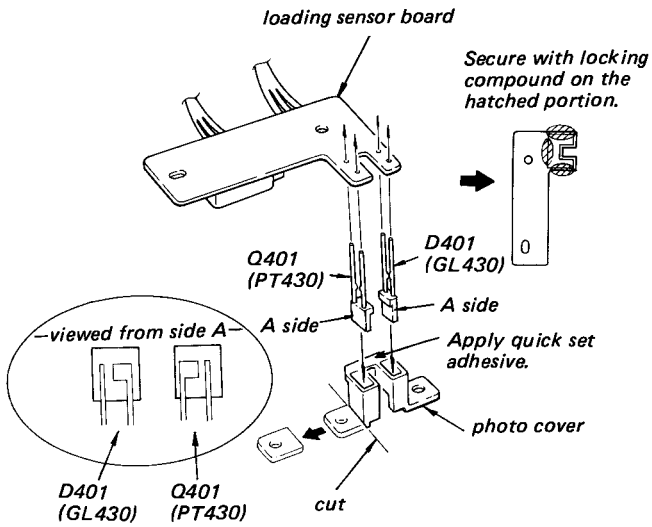
loading motor (M901)

worm wheel (A)

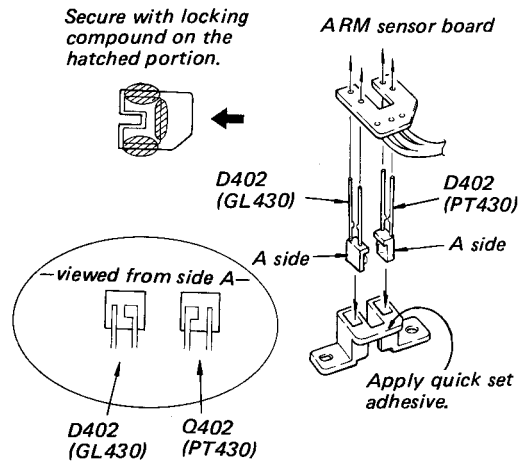
CAUTION ON REPLACING PHOTO TRANSISTORS (Q401, 402), LED (D401, 402) FOR BLANK SPACE POSITION AND ARM POSITION DETECTION.

- Be careful of the mounting direction on replacing photo transistors (Q401, 402), LED (D401, 402).
- After replacing, secure photo cover to the board by applying quick set adhesive and then locking compound.

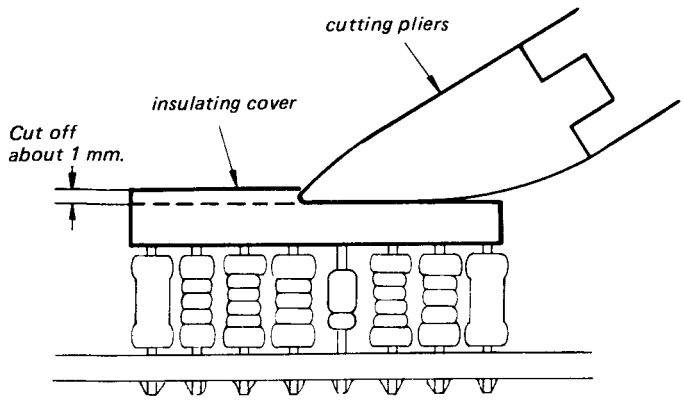
For blank space position detection (Q401, D401)



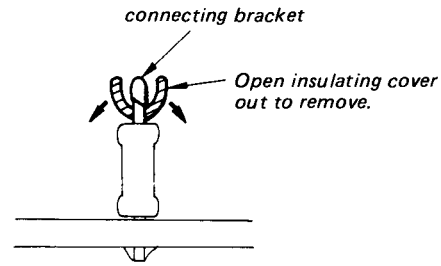
For arm position detection (Q402, D402)

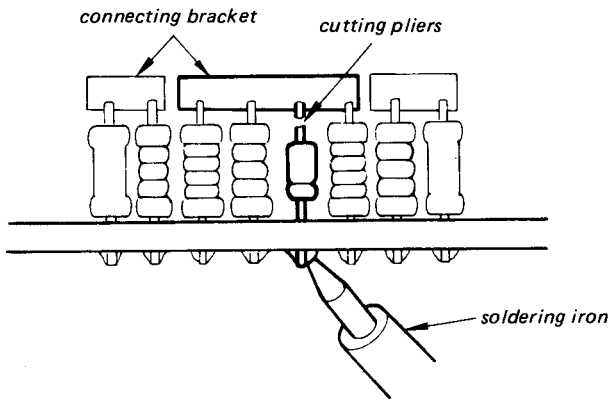


REPAIR METHOD FOR HYBRID CIRCUIT BLOCK

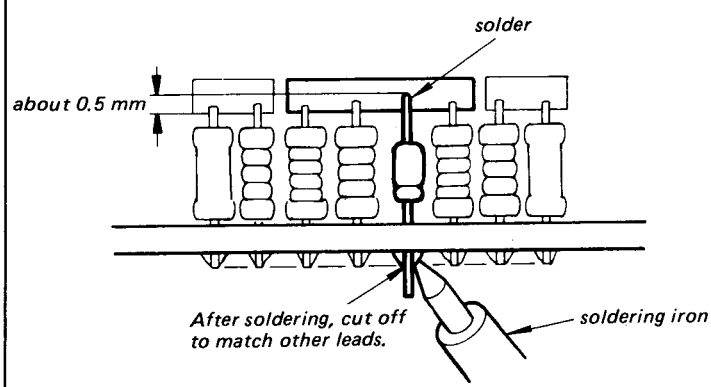


Using a cutting pliers, cut off the upper portion of the insulating cover about 1 mm, exposing the top of the connecting brackets.

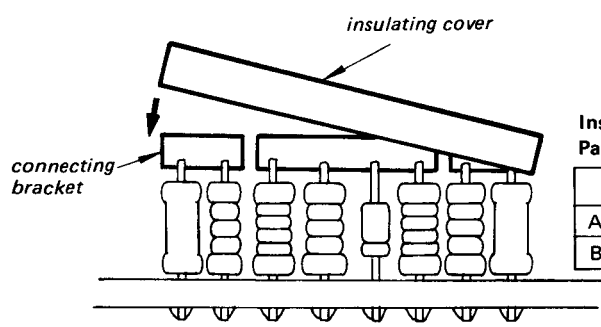




Cut off the lead of the defective part with cutting pliers. Remove solder and take out the defective part.



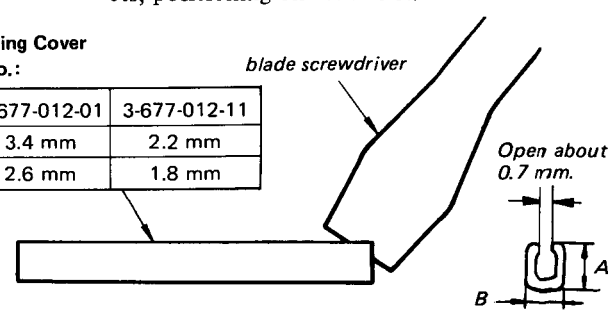
Insert the new part on the board and solder the lead to the board. Cut off the lead on the connecting bracket side so that it overlaps by about 0.5 mm, and solder to the connecting bracket.



Open the insulating cover groove about 0.7 mm and place over the connecting brackets, positioning one end first.

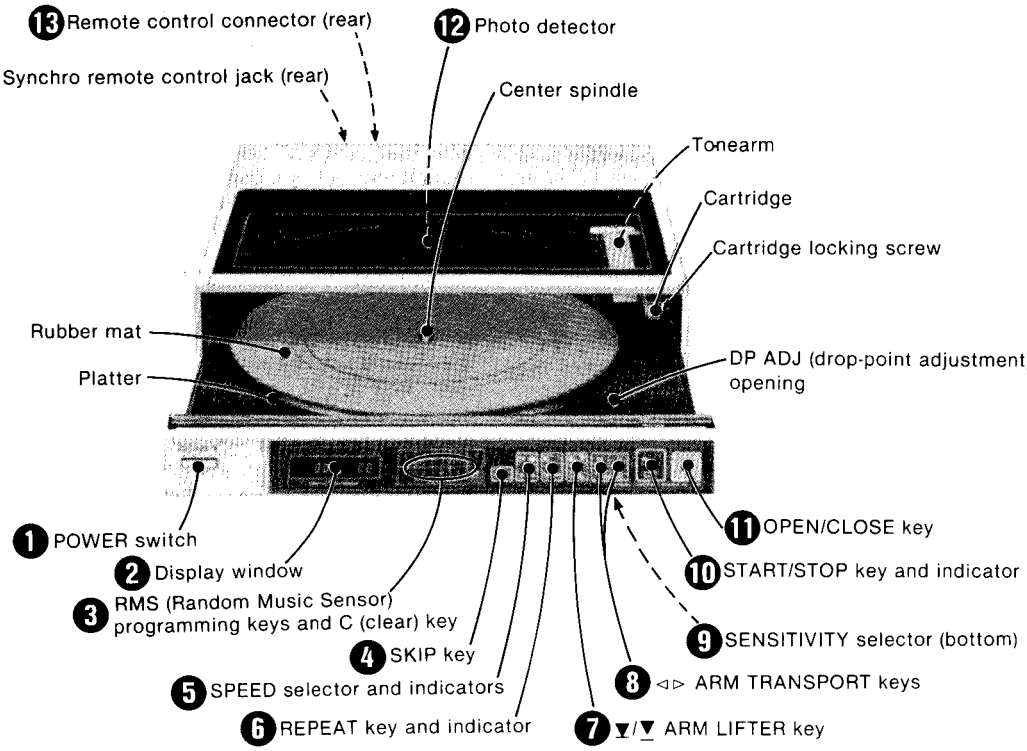
Insulating Cover Part No.:

	3-677-012-01	3-677-012-11
A	3.4 mm	2.2 mm
B	2.6 mm	1.8 mm



LOCATION AND FUNCTION OF CONTROLS

The photo below shows the assembled turntable.



❶ POWER switch
Depress to turn on the turntable. To turn the turntable off, press it again.

❷ Display window
The elapsed playing time of the selection, the number of the selection being played, the programmed selections for RMS play, etc. are displayed in this window. See page 11.

❸ RMS (Random Music Sensor) programming keys and C (clear) key
Used for programming the selections to be played in the desired sequence. See "RMS play" on page 10.

❹ SKIP key
Press this key to skip from the selection being played to the next selection. See "To skip to the desired selection while the record is playing" on page 10.
This key is also used for AMS (Automatic Music Sensor) play. See "AMS play" on page 10.

❺ SPEED selector and indicators
When the power is turned on, the speed is automatically set to 33⅓ rpm, and the "33" indicator lights up.
Press this key when a 45 rpm record is to be played, the "45" indicator lights up. Press it again for a 33⅓ rpm record.

❻ REPEAT key and indicator
Press this key to repeat play. Repeat play continues until this key is pressed to release it. During RMS play, only the programmed selections will be repeated in the programmed sequence.

❼ ▼/▼ ARM LIFTER key
This key lifts and lowers the tonearm. When the tonearm is on the arm rest, this key is not operative.

❽ ◁▷ ARM TRANSPORT keys
To move the tonearm inward, press the ◁ key, and to move outward, the ▷ key. The tonearm is raised and continues to move while the key is pressed. The tonearm will stop when the key is released. For fine adjustments, press and immediately release the appropriate key.

❾ SENSITIVITY selector (on the bottom)
Normally set this selector to M.
When the number of the selections detected is not correct, set the selector to either H or L. See page 7.

❿ START/STOP key and indicator
Press to start the record playing. The □ indicator on the key will light up. To stop during play, press it again.

⓫ OPEN/CLOSE key
With one touch of this key the turntable module automatically opens for loading a record. With another touch the module automatically closes.

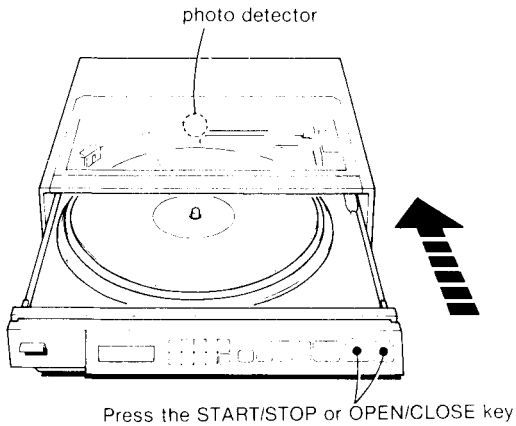
⓬ Photo detector
Detects the record size (30 cm, 25 cm and 17 cm) and how many selections are on a record, by searching for blank spaces between selections when the module closes.
See page 7.

⓭ Remote control connector (rear)
Connect the remote control cord of the optional ST-V7/V7L system control tuner. For details, read the instruction manual for the system control tuner.

⓮ Synchro remote control jack (rear)
Synchronized recording from disc to tape is possible on specified Sony cassette decks by using the optional RM-65 synchro remote control unit.

HOW RECORD SIZED AND SELECTIONS ARE DETECTED

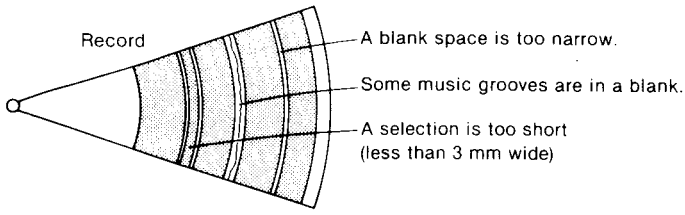
When the module closes, the photo detector searchs over the record to detect the record size (30 cm, 25 cm or 17 cm) and sense how many selections are on the record, by detecting the blank spaces between selections. The selection number indicator changes rapidly from 01 to the number of the selection contained on the record. Up to 15 selections can be counted. The data is input into the memory of the microcomputer incorporated.
This data will be erased from the memory when the OPEN/CLOSE key is pressed to open the module or when the POWER switch is turned off.



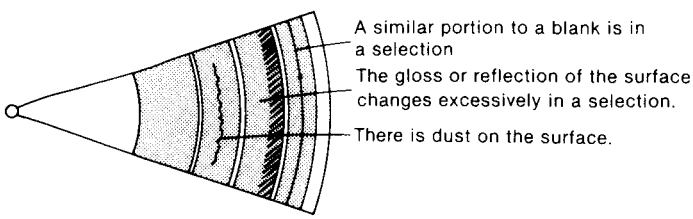
Caution
Do not press the OPEN/CLOSE key while the module is closing. If the key is pressed at such a time, the module will slide out and it will not slide back in, even if the OPEN/CLOSE key is pressed again. In this case, after the module has been opened completely, press the OPEN/CLOSE key again.

SENSITIVITY selector
Since the photo detector searches for the blank spaces on a record, it cannot operate correctly if the blank spaces and music grooves are not in good condition. As a result, the RMS, AMS and skip function may malfunction.
If the number of the selections detected is different from the number of the selections actually existing, change the position of the SENSITIVITY selector on the bottom of the unit to either H (high) or L (low).

Why too few selections are detected :



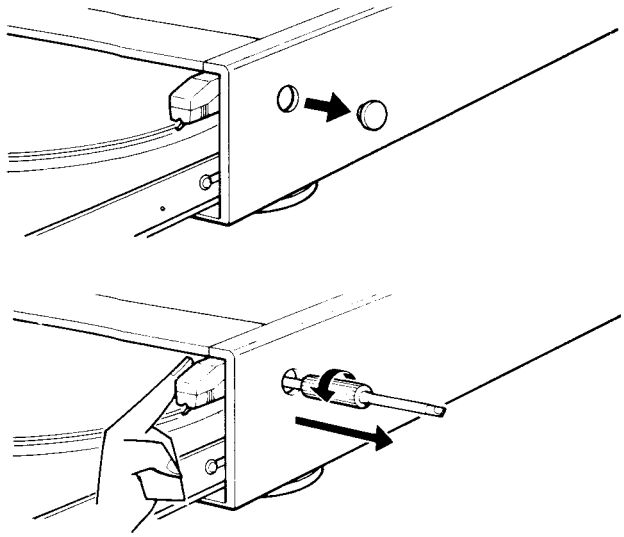
Why too many selections are detected :



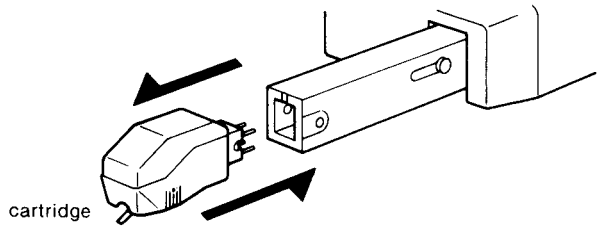
Special records
The photo detector cannot operate with transparent records, non-standardized records and records of an unusual shape or color (red or blue). Play these record manually.

INSTALLING A CARTRIDGE OTHER THAN THE ONE SUPPLIED

1 Press the POWER switch, then press the OPEN/CLOSE key to open the module.
2 Remove the cap on the right side, insert the supplied screwdriver through the hole, and remove the cartridge locking screw with the screwdriver.
The screw can be removed, clinging to the head of the screwdriver.



3 Remove the rubber mat and platter.
4 Press the ◁ key to move the tonearm for easier installation. Then turn the POWER switch off.
5 Remove the old cartridge and plug the new one into the tonearm.

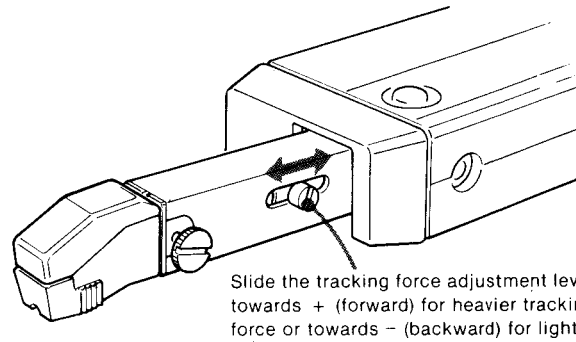


6 Depress the POWER switch (⏏ ON), and the tonearm will return to the arm rest.
7 Tighten the cartridge locking screw to the tonearm, by inserting the screwdriver holding the screw through the hole and turning it clockwise.
8 Replace the cap, platter and rubber mat.

The T4P label indicates that a cartridge is a standardized plug-in type.

TRACKING FORCE FINE ADJUSTMENT

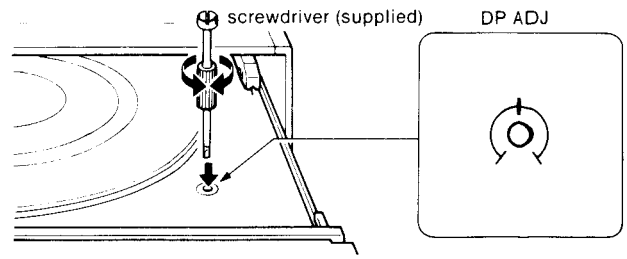
The tracking force has been correctly adjusted at the factory. Make fine adjustment only when the tracking force is so light that the stylus skips grooves.
1 Depress the POWER switch, then press the OPEN/CLOSE key to open the module.
2 Press the ◁ key to move the tonearm toward the center spindle.
3 Slide the tracking force adjustment lever.



Slide the tracking force adjustment lever towards + (forward) for heavier tracking force or towards − (backward) for lighter tracking force.

TONEARM DROP-POINT ADJUSTMENT

The tonearm's drop-point during auto play, AMS play or RMS play has been adjusted at the factory. Adjust this if the stylus does not lower correctly at the beginning of the desired selection.
1 Press the OPEN/CLOSE key to open the module.
2 Insert the supplied screwdriver into the DP ADJ opening.
To move the drop-point inward, turn the screw clockwise.
To move the drop-point outward, turn the screw counterclockwise. Do not turn it so far counterclockwise that the stylus tip cannot make contact with the record.

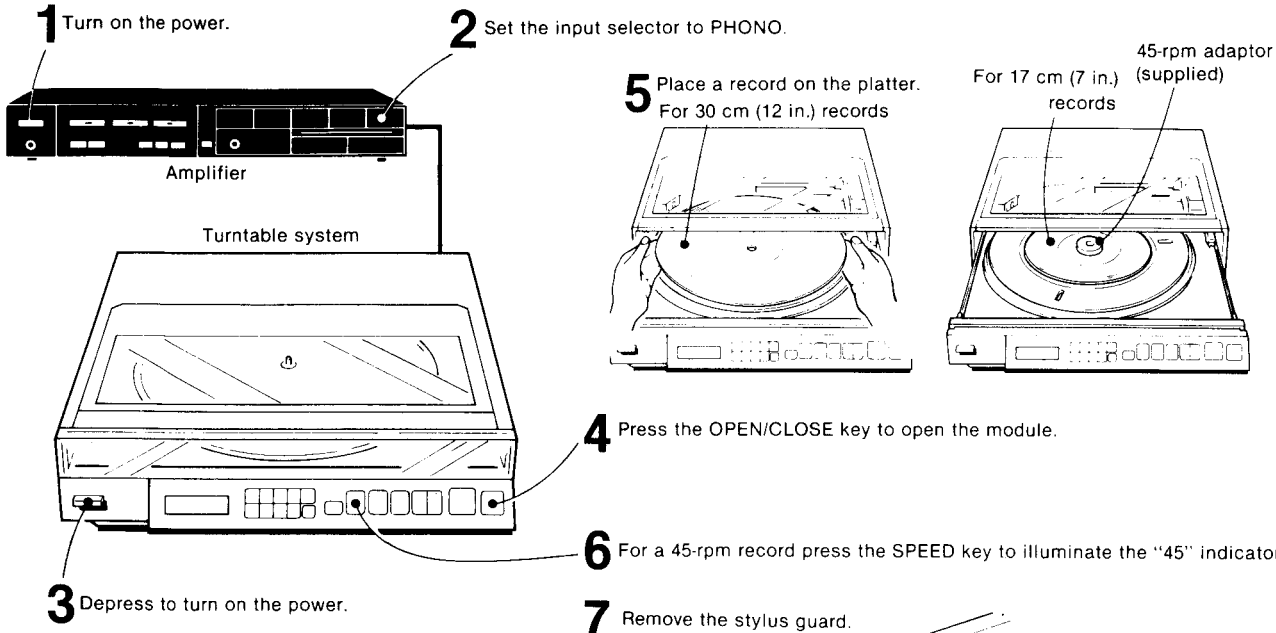


3 Check if the drop-point is correctly adjusted by lowering the tonearm to the beginning of a selection in the middle of the record, using the AMS function.
(Checking the drop-point for the first selection is not sufficiently accurate.)
If the drop-point is correct for one selection, it will also be correct for all the selections.

RECORD PLAYING

PREPARATION

This turntable's photo detector detects the record size and the number of the selections on the record when the module closes. Therefore **after turning the power on, be sure to press the OPEN/CLOSE key to open the module** so that the detector is on standby.



Notes

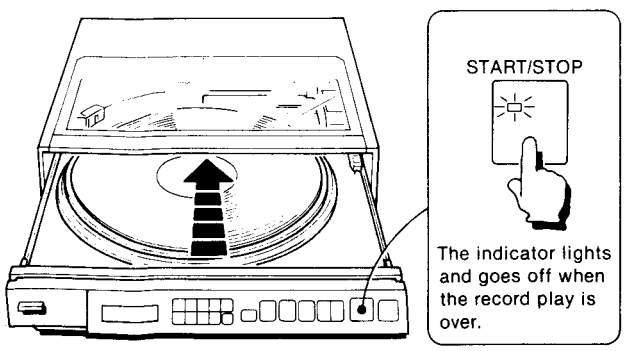
- If the turntable causes interference to radio and television reception, turn off the turntable or move the turntable away from the receiver.
- A badly warped record cannot be played because it will rub against the tonearm.

AUTO PLAY

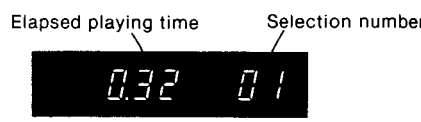
—To begin record play from the beginning of the record

The record size is detected and playback starts from the beginning of the first selection for either 30 cm (12 inch), 25 cm (10 inch) or 17 cm (7 inch) records.

1 Press the START/STOP key. The module closes and play will begin.



The selection number being played and the elapsed playing time from the beginning of the selection (in minutes and seconds) are displayed in the display window.



When the tonearm reaches the end of the record, the turntable will stop and the tonearm will automatically return to the arm rest.

Notes

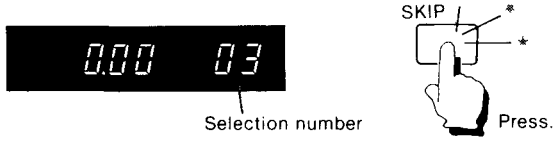
- Transparent records, records of an unusual shape or color (red or blue), or non-standardized records cannot be played automatically. To play these records, follow the instructions on page 11.
- Turn off the POWER switch after the tonearm returns to the arm rest. If the POWER switch is turned off while the tonearm is returning to the arm rest, when you press the POWER switch the next time the tonearm will return to the arm rest. While the tonearm is moving, the START/STOP key is not activated.

AMS (AUTOMATIC MUSIC SENSOR) PLAY

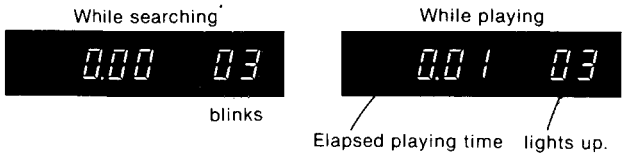
—To begin record play from the desired selection

1 Press the OPEN/CLOSE key to open the module, put on a record and select the correct record speed.

2 Press the SKIP key repeatedly until the number of the selection from which you want to start play is displayed.
Each time the SKIP button is pressed, the selection number display changes up 1, as far as 15, then resets to 01.



3 Press the START/STOP key. The module closes, the tonearm searches for the preset selection and play begins.

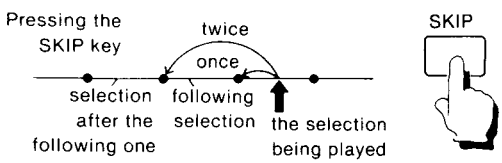


Note

If selection number which does not exist (for example, "08" for a record which contains only 7 selections) is input, the "E" (error) indicator appears and flashes several times. In this case, input an appropriate selection number.

TO SKIP TO THE DESIRED SELECTION WHILE THE RECORD IS PLAYING —Using the SKIP function

1 Press the SKIP key repeatedly during play until the number of the desired selection is displayed.
Each time the SKIP key is pressed, the next selection in advance is displayed, and when the last selection has been played, the display reverts to 01.



The tonearm will lift up, search for the preset selection and play will start automatically.

Note

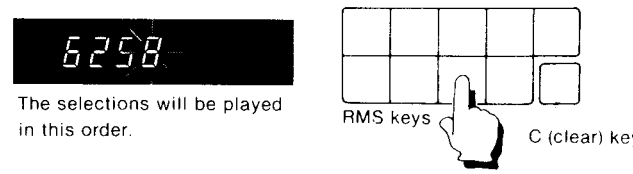
The SKIP function is inoperative while the tonearm is in the raised position after the ▼/▼ key or the ◁▷ key has been pressed or while the record is playing with the module open.

RMS (RANDOM MUSIC SENSOR) PLAY

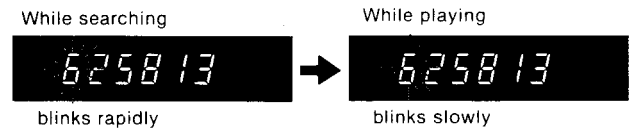
You can play selections on one side of the record in the desired sequence, which has been programmed using the RMS keys.

1 Press the OPEN/CLOSE key to open the module, put on a record and select the record speed.

2 Press the RMS keys in the sequence in which you want to listen to the selections.
The programmed selection numbers are displayed from left to right in the order in which they are to be played.
Up to 8 selections can be programmed.



3 Press the START/STOP key.
The module closes and play begins from the first-programmed selection.



At the end of the last-programmed selection, the turntable will stop rotating and the tonearm will return to the arm rest automatically. If you wish to play the same selections in the same sequence again, press the START/STOP key.

To change the programmed sequence

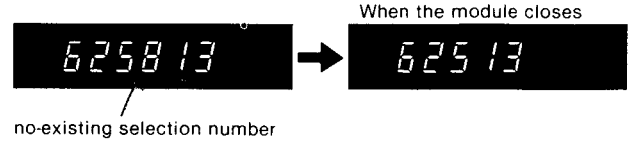
Press the C key when the tonearm is on the arm rest.
The display will change to 0.00 and the programmed sequence will be erased. Then press the RMS keys again in the desired sequence.

To add to the programmed sequence

Just press the desired RMS key(s) during play or when the tonearm is on the arm rest. (While the tonearm is searching for a selection, the RMS keys are not operative.) Up to 8 selections can be programmed.

Automatic editing function of the RMS program

If an RMS key whose number exceeds the existing selections is pressed with the module open, the display of that number will disappear automatically when the module closes.



If an incorrect RMS key is pressed with the module closed, the number of the key will not be displayed.
This is an automatic editing function of the RMS program.
If the pressed RMS keys are all incorrect, the "E"(error) indicator will flash several times, then go out. In this case press the correct RMS keys.

To cancel the RMS program

Press the ◁▷ key or the OPEN/CLOSE key during play, or press the C key when the tonearm is on the arm rest. The display will change to 0.00 and the programmed sequence will be erased.

TO LIFT UP THE STYLUS DURING RMS PLAY

To lift up the stylus for a moment and then start playing from the same point, press the ▼/▼ key. To lower the tonearm onto the record, press the ▼/▼ key again.

TO STOP DURING RMS PLAY

Press the START/STOP key. The tonearm will return to the arm rest and the turntable will stop rotating.
When the START/STOP key is pressed again, the RMS play will restart.

TO SKIP SELECTIONS DURING RMS PLAY

Press the SKIP key during play. Each time the SKIP key is pressed, the next selection ahead is played.

TO REPEAT RMS PLAY IN THE PROGRAMMED SEQUENCE

Press the REPEAT key either before or after starting RMS play. At the end of the last-programmed selection, the tonearm will return to the first-programmed selection automatically, then play will restart.
To stop during repeat play, press the REPEAT key. When the last-programmed selection has been played, the tonearm will return to the arm rest and repeat function will be cancelled.
If you press the START/STOP key during repeat play, play will stop immediately, the tonearm will return to the arm rest and the repeat function will be cancelled.

DISPLAY WINDOW

Time counter and selection number indicator
Normally, the time counter and the selection number indicator are displayed in the display window.

Time counter : Indicates the elapsed playing time of the selection being played in minutes and seconds. The counter starts counting the time at the beginning of the selection (in auto play and RMS play) or at the point where the tonearm is lowered onto the record (in manual play).
Selection number indicator : Remains lit to indicate the number of the selection being played, and flashes while the tonearm is searching for the selection.
When the record is being played with the module open, this indicator does not operate.

RMS program indicator
When the RMS key is pressed, the display switches to the RMS program indicator.

The selection number are displayed from left to right in the programmed sequence. When the tonearm is searching for the selection, the number flashes rapidly. When the selection is being played, the number flashes slowly.

Error indicator

The "E" (error) indicator appears and will disappear after flashing several times in the following cases.
•When the START/STOP key is pressed, but there is no record on the platter.
•When the START/STOP key is pressed before the module has opened once.
•When inappropriate selection numbers are set for AMS or RMS play with the module open, and the START/STOP key is pressed.

Note
The time counter indication may be slightly different from the time indicated on the record jacket, as the former includes the time equivalent to the blank space between the selections.

SECTION 1
OUTLINE

1-1. CIRCUIT DESCRIPTION

SYSTEM CONTROL MICROCOMPUTER IC301

Conditions for IC301 beginning operation:

1. 5 V supplied to power supply pin ((41)).
2. Reset pin ((7)) goes from 0 V to 5 V.
3. Clock oscillation pins ((1), (42)) are oscillating at 800 kHz.
4. Check input in other operation modes.

Pin No.	Pin Name	Function
1	XTAL (I/O)	Clock oscillation pin.
2	C0 (O)	Marker correction.
3	C1 (O)	Reset output to fluorescent display tube drive IC. Drum correction.
4	C2 (O)	Data transmission clock output to fluorescent display tube drive IC. Function key output.
5	C3 (O)	Decimal point output to fluorescent display tube drive IC. Function key output.
6	Blank sensor (I)	Record blank (between selection) position data input. (active: L)
7	$\overline{\text{RES}}$ (I)	Reset input.
8 – 11	D0 – D3 (O)	Function key output. (active: L) Data output to fluorescent display drive IC.
12	$\overline{\text{S/S}}$ (O)	Function key display LED output. (active: L)
13	$\overline{33}$ (O)	
14	$\overline{45}$ (O)	
15	$\overline{\text{REPEAT}}$ (O)	
16	$\overline{\text{MUTE}}$ (O)	Cartridge muting output. (active: L)
17	CLOSE (O)	Output to close turntable. (active: H)
18	OPEN (O)	Output to open turntable. (active: H)
19	————	Not used on this model.
20	TEST (I)	Test pin. Connected to GND.
21	VSS	Power supply ground pin.
22	◀◀ (O)	Tonearm drive high speed FWD output. (active: H)
23	▶▶ (O)	Tonearm drive high speed BACK output. (active: H)
24	◀ (O)	Tonearm drive low speed FWD output. Outputs for 400 mS after ARM TRANSPORT key (◁) is pushed. (active: H)
25	▶ (O)	Tonearm drive low speed BACK output. Outputs for 400 mS after ARM TRANSPORT key (▷) is pushed. (active: H)
26	PM Kick (O)	Arm UP/DOWN solenoid kick signal output. Outputs for 800 mS after ARM LIFTER (▼/▼) key is pushed. (active: H)
27	PM Hold (O)	Arm UP/DOWN solenoid hold signal output. (active: H)

Pin No.	Pin Name	Function
28	PAUSE (O)	Synchro PAUSE signal output. Outputs for 200 mS after arm completes down operation. (active: H)
29	REC MUTE (O)	Synchro REC MUTE signal output. Outputs for 200 mS before arm performs up operation. (active: H)
30	$\overline{\text{ARM INH}}$ (I)	Arm offset angle correction prohibition. (active: L)
31	————	Not used on this model.
32	TT (O)	Turntable drive signal output. (active: H)
33	Arm position (I)	Input to detect tonearm position.
34	Record position (I)	Address pulse signal input of record blank position data.
35	END sensor (I)	Record END position data input.
36	————	Not used on this model.
37	B0 (I)	Function key matrix input. (active: L)
38	B1 (I)	
39	B2 (I)	
40	B3 (I)	
41	VDD (I)	5 V power supply.
42	EXTAL (I)	Clock oscillation pin.

KEY MATRIX

Pin No. (O) / Pin No. (I)	② C0	③ C1	④ C2	⑤ C3	⑧ D0	⑨ D1	⑩ D2	⑪ D3
㊲ B0	marker correction	drum correction	OPEN SW	SPEED KEY	1 KEY	5 KEY	9 KEY	OPEN/CLOSE KEY
㊳ B1			CLOSE SW	REPEAT KEY	2 KEY	6 KEY	CLEAR KEY	▼/▼ ARM LIFTER KEY
㊴ B2		————	ARM REST SW	▷ (FWD) KEY	3 KEY	7 KEY	SKIP KEY	REMOTE CONTROL START
㊵ B3		————	DOWN SW	◁ (BACK) KEY	4 KEY	8 KEY	START/ STOP KEY	REMOTE CONTROL STOP

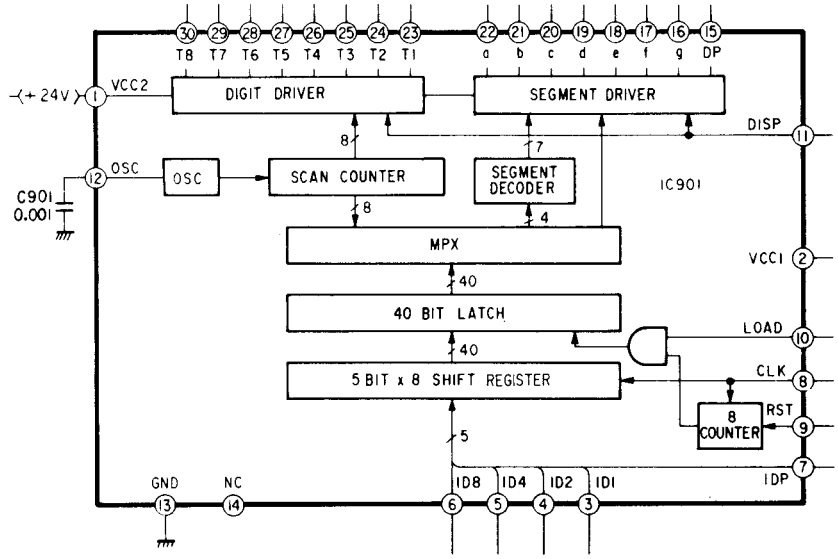
Note: Marker correction, drum correction, Down SW: active high
others: active low

8 DIGIT INDICATOR TUBE DRIVER (M54940P)

M54940P is a fluorescent indicator tube decode driver which memorizes the 5 bit x 8 digit data from the system control microcomputer (IC102) and performs (7 segment + decimal point) x 8 digit display by the dynamic lighting method.

One digit worth of data consists of BCD 4 bits and decimal point 1 bit (always high on this model).

The data memory is carried out by the shift register latch form, and previous data can be indicated during data forwarding.

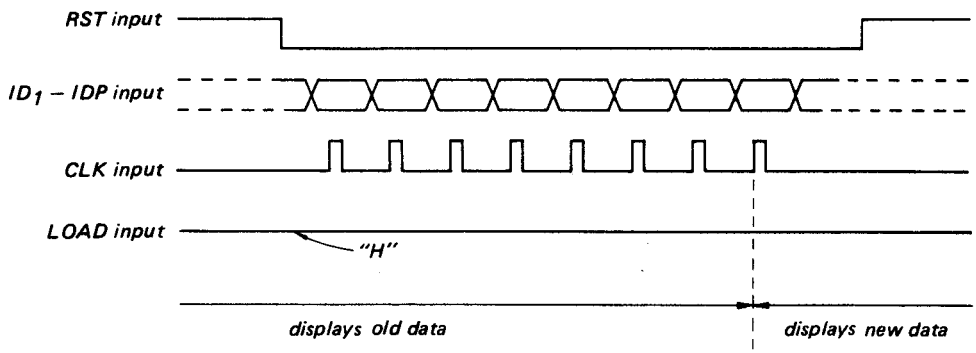


M54940P Block Diagram

1) Pin Function Description

Pin No.	Pin Name	Function
1	Vcc2	Power supply for indicator tube output.
2	Vcc1	Power supply for logic circuit.
3 – 6	ID_{1-8}	BCD data input pins.
7	IDP	Decimal point data input pin.
8	CLK	Data forwarding clock input pin. Data is read in at clock rising edge.
9	RST	Reset input pin. At high, resets CLK input pulse counter.
10	LOAD	Input pin for signal which loads shift register data to data latch.
11	DISP	Indicates at high, no indication at low. During no indication, segment and digit outputs are low. The display can be erased by making this low.
12	OSC	Oscillation pin.
13	GND	Ground.
14	NC	Do not connect.
15	DP	Decimal point output pin.
16 – 22	a – g	Segment output pin.
23 – 30	T_{1-8}	Digit output.

2) Data Read-in Timing



Automatically loaded at 8th clock rising edge from RST "low".

Data Read-in Timing

3) Input Data and Indication

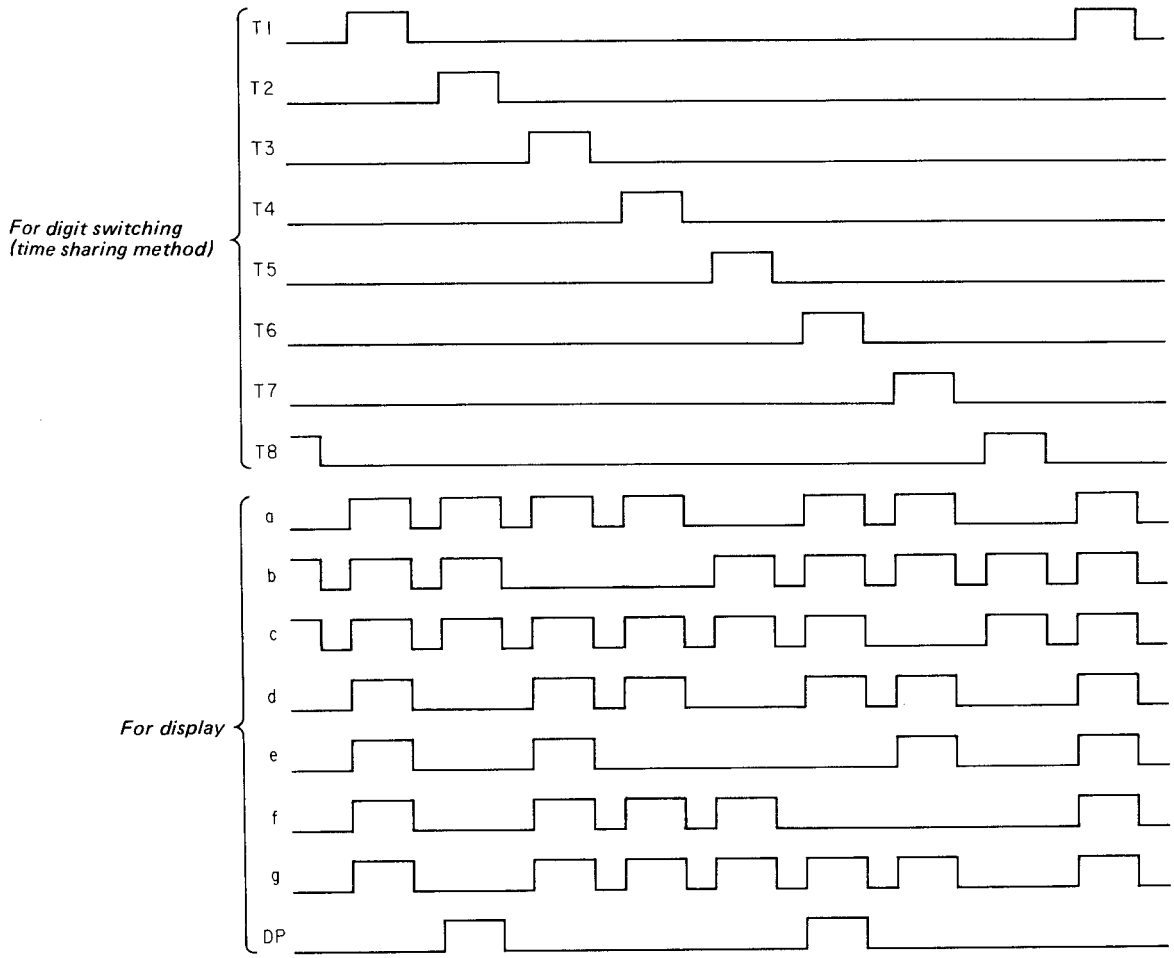
	BCD Data Input				Display
	ID_8	ID_4	ID_2	ID_1	
0	L	L	L	L	0
1	L	L	L	H	1
2	L	L	H	L	2
3	L	L	H	H	3
4	L	H	L	L	4
5	L	H	L	H	5
6	L	H	H	L	6
7	L	H	H	H	7
8	H	L	L	L	8
9	H	L	L	H	9
A	H	L	H	L	A
B	H	L	H	H	B
C	H	H	L	L	C
D	H	H	L	H	D
E	H	H	H	L	E
F	H	H	H	H	F

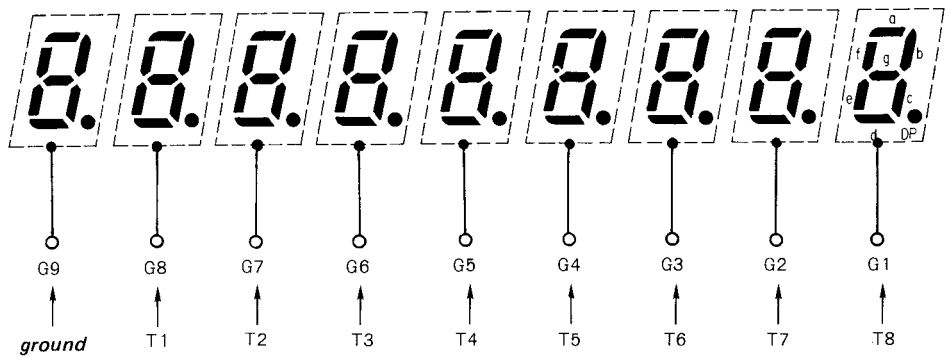
Decimal point output is output when a digit's decimal point bit is high, independent of BCD data.

Also, if several decimal point bits are made high, multiple decimal points will be displayed.

Relationship between Input Data and Indication

4) Data Output and Indication





Pin No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Connection	F⊖	G9	g	G8	f	G7	e	G6	d	G5	NP	G4	DP	G3	c	G2	b	G1	a	F⊕

Indicator tube grid is controlled by time sharing method.

Relationship Between Data Output and Indication

BLANK DETECTION CIRCUIT

When turntable loading close operation is performed, this set checks record information (record loaded or not, size (30 cm, 25 cm, 17 cm), number of selections) optically.

For blank (between selection) detection, there are two types of data relative to system control microcomputer IC301: horizontal position data (address) and data which identifies blanks.

Horizontal position data is obtained by converting the light intensity from the slit plate directly connected to the loading motor to an electrical signal by photo Tr (Q401), and counting this pulse inside the system control microcomputer. Blank data is obtained by converting the intensity of the reflected light at sound grooves and non-sound grooves into electrical signals by photosensor (Q405) and identifying blanks inside the system control microcomputer.

The system control microcomputer gets the number of pulse changes from the marker position from these two data and judges record mounted or not, size (30, 25, 17 cm) and blank, record end, etc. positions. The difference between blanks and record end is identified inside the system control microcomputer by the length of time that the blank signal is low.

The circuit operation is shown in Figure 3.

- Reference voltage waveforms during turntable loading close operation.

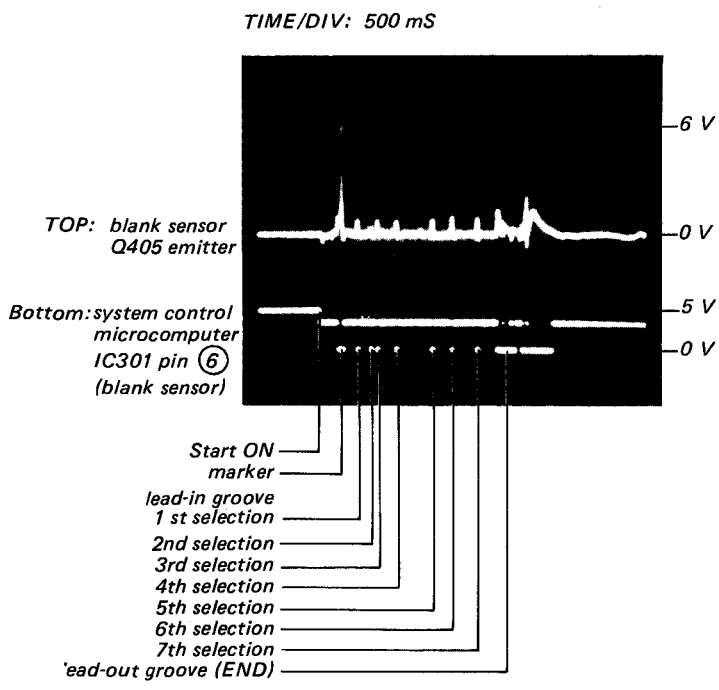


Figure 1

Q703–705, IC703 (1/2) CIRCUIT

When the blank sensor (Q405) finds the marker, voltage with a widening at the bottom of more than 5 V is output. At this time, if comparator (IC303) reference voltage is low, the marker position looks fast as seen from the system control microcomputer (IC301). Because of this, Q705 is turned on during marker detection to raise reference voltage to 2.5 V. See Figure 3 for circuit operation.

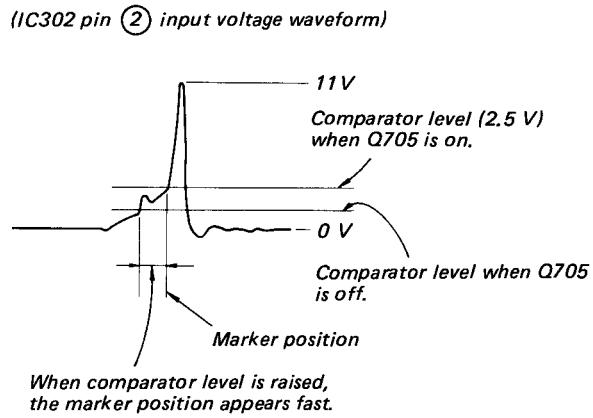
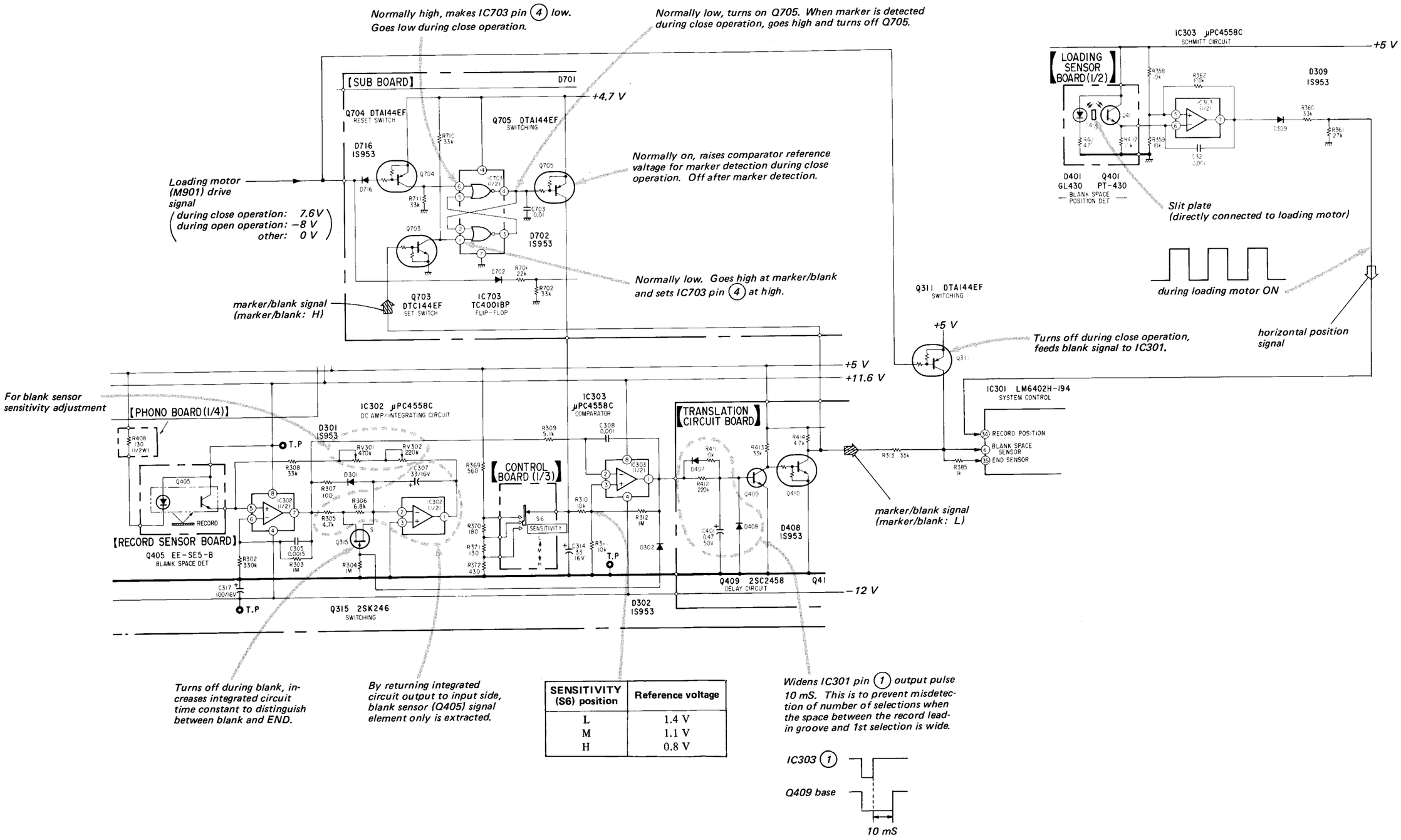


Figure 2



SENSITIVITY (S6) position	Reference voltage
L	1.4 V
M	1.1 V
H	0.8 V

Figure 3

PS-FL99

RECORD WARP SERVO CIRCUIT

This circuit is so that the stylus will always be lowered at the place where blank was detected during turntable loading close operation for auto play.

If there is record hole play, or warp, even if the stylus is lowered at the location detected as blank by the system control microcomputer (IC301), the position may be wrong.

In order to get rid of this difference, this circuit causes the arm UP/DOWN solenoid (PM401) kick signal to be generated so that the stylus descends at the blank detected location.

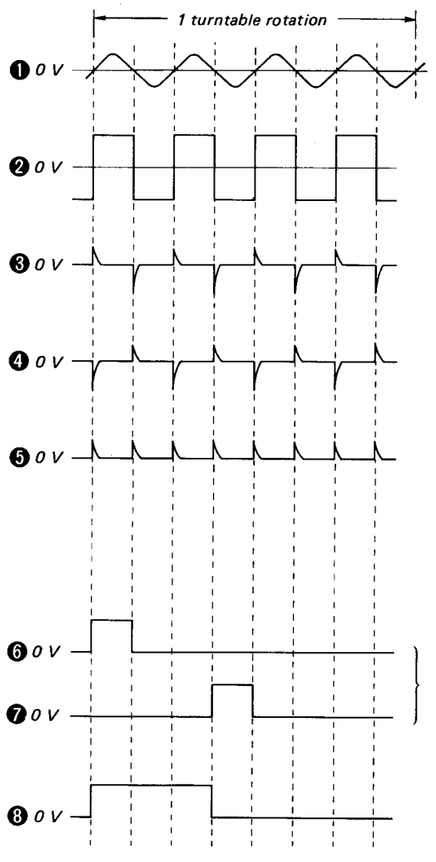
The method of kick signal generation is as follows.

The turntable motor 8-pole magnet is used, and it is detected by the hole sensor (H401), DC amplification and wave shaping are performed at IC401, and this signal is input as an octal counter clock. Then, by resetting the octal counter at the completion of turntable loading close, the 8 outputs of this octal counter have memorized 8 set locations when the turntable was rotating. (Counter "0" is where blank was detected.)

Even if the kick signal for lowering the stylus on the blank detected location on a rotating record is generated when the detected location is under the stylus, the location will move during the time that the stylus is descending. So, it is generated at the location which is the blank detected location minus the amount of movement.

The speed of descent varies with the arm, so by switching the octal counter output, kick signal generation timing can be changed and adjusted.

Refer to waveforms ❶ – ❽ below and Figure 4 for circuit operation.



When the turntable rotates, 4 cycles of a sine wave are generated in one rotation by the rotor main magnet (alternate SN, 8 poles).

DC amplified and waveform shaped at IC401.

Converted to pulse at C422, R422, R423 differential circuit.

Converted to pulse at Q412, C403, R427 differential circuit.

Waveforms ❸, ❹ mixed at D409, D410 OR circuit. This pulse becomes octal counter (IC701) clock and is counted.

IC701 output waveform.

This pulse generated when IC301 pin (27) PM maintain signal is high, and kicks arm UP/DOWN solenoid (PM401)..

Figure 4

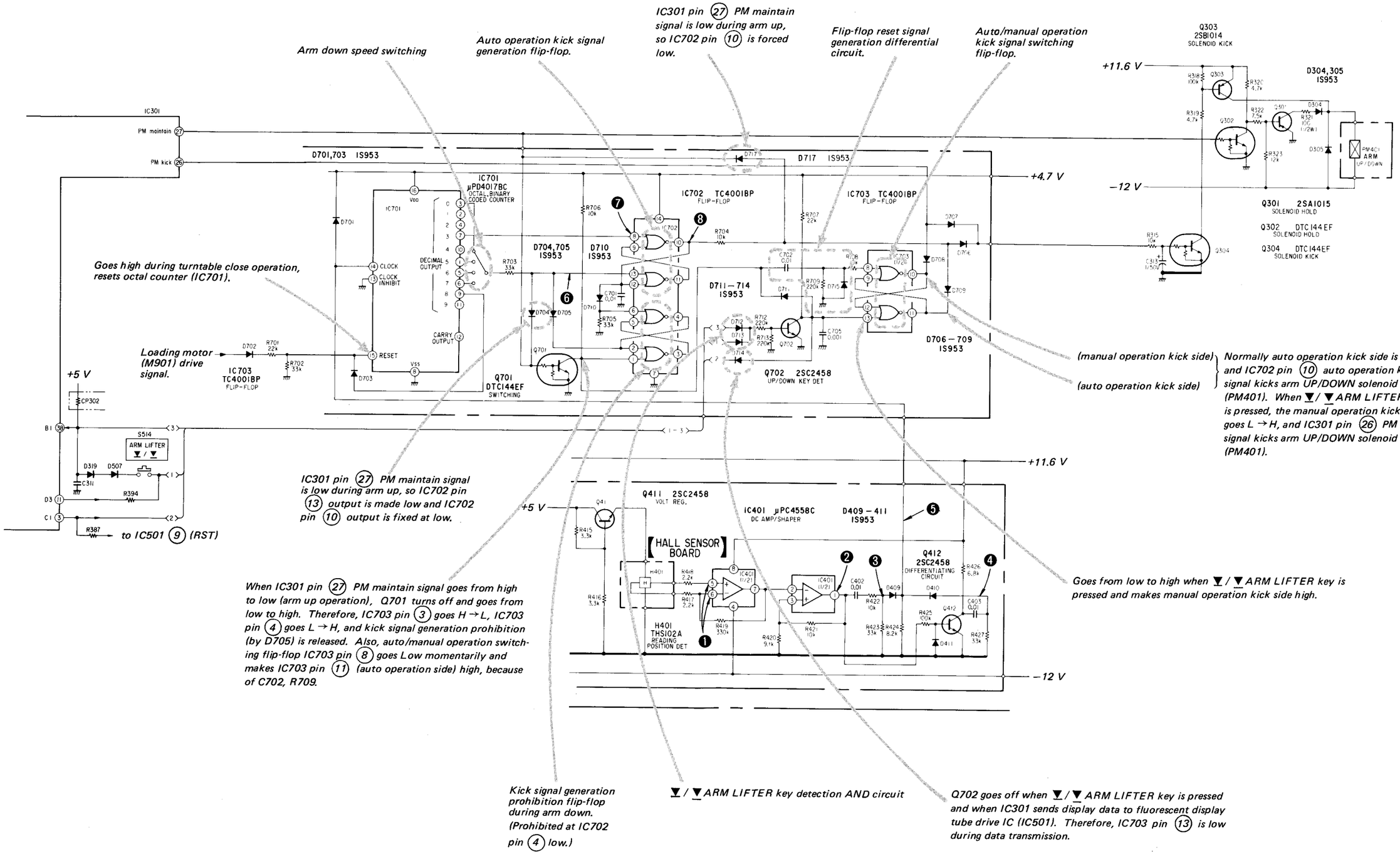

Arm down speed switching
Auto operation kick signal generation flip-flop.
IC301 pin (27) PM maintain signal is low during arm up, so IC702 pin (10) is forced low.
Flip-flop reset signal generation differential circuit.
Auto/manual operation kick signal switching flip-flop.
IC301
PM maintain (27)
PM kick (26)
D701,703 IS953
D717 IS953
IC701 µPD4017BC OCTAL, BINARY CODED COUNTER
IC702 TC4001BP FLIP-FLOP
IC703 TC4001BP FLIP-FLOP
+4.7 V
Goes high during turntable close operation, resets octal counter (IC701).
D704,705 IS953
D710 IS953
D711–714 IS953
D706–709 IS953
Loading motor (M901) drive signal.
IC703 TC4001BP FLIP-FLOP
Q701 DTC144EF SWITCHING
Q702 2SC2458 UP/DOWN KEY DET
+5 V
S514 ARM LIFTER ▼ / ▼
to IC501 (9) (RST)
IC301 pin (27) PM maintain signal is low during arm up, so IC702 pin (13) output is made low and IC702 pin (10) output is fixed at low.
+11.6 V
Q411 2SC2458 VOLT REG.
IC401 µPC4558C DC AMP/SHAPER
D409–411 IS953
HALL SENSOR BOARD
H401 THS102A READING POSITION DET
Q412 2SC2458 DIFFERENTIATING CIRCUIT
–12 V
When IC301 pin (27) PM maintain signal goes from high to low (arm up operation), Q701 turns off and goes from low to high. Therefore, IC703 pin (3) goes H→L, IC703 pin (4) goes L→H, and kick signal generation prohibition (by D705) is released. Also, auto/manual operation switching flip-flop IC703 pin (8) goes Low momentarily and makes IC703 pin (11) (auto operation side) high, because of C702, R709.
Goes from low to high when ▼ / ▼ ARM LIFTER key is pressed and makes manual operation kick side high.
Kick signal generation prohibition flip-flop during arm down. (Prohibited at IC702 pin (4) low.)
▼ / ▼ ARM LIFTER key detection AND circuit
Q702 goes off when ▼ / ▼ ARM LIFTER key is pressed and when IC301 sends display data to fluorescent display tube drive IC (IC501). Therefore, IC703 pin (13) is low during data transmission.
Q303 2SB1014 SOLENOID KICK
D304,305 IS953
Q301 2SA1015 SOLENOID HOLD
Q302 DTC144EF SOLENOID HOLD
Q304 DTC144EF SOLENOID KICK
PM401 ARM UP/DOWN
(manual operation kick side)
(auto operation kick side)
Normally auto operation kick side is high, and IC702 pin (10) auto operation kick signal kicks arm UP/DOWN solenoid (PM401). When ▼ / ▼ ARM LIFTER key is pressed, the manual operation kick side goes L→H, and IC301 pin (26) PM kick signal kicks arm UP/DOWN solenoid (PM401).

Figure 5

TIMING CHART

Indicates timing from turntable open state when START key is turned on and close switch (S4) turns on.

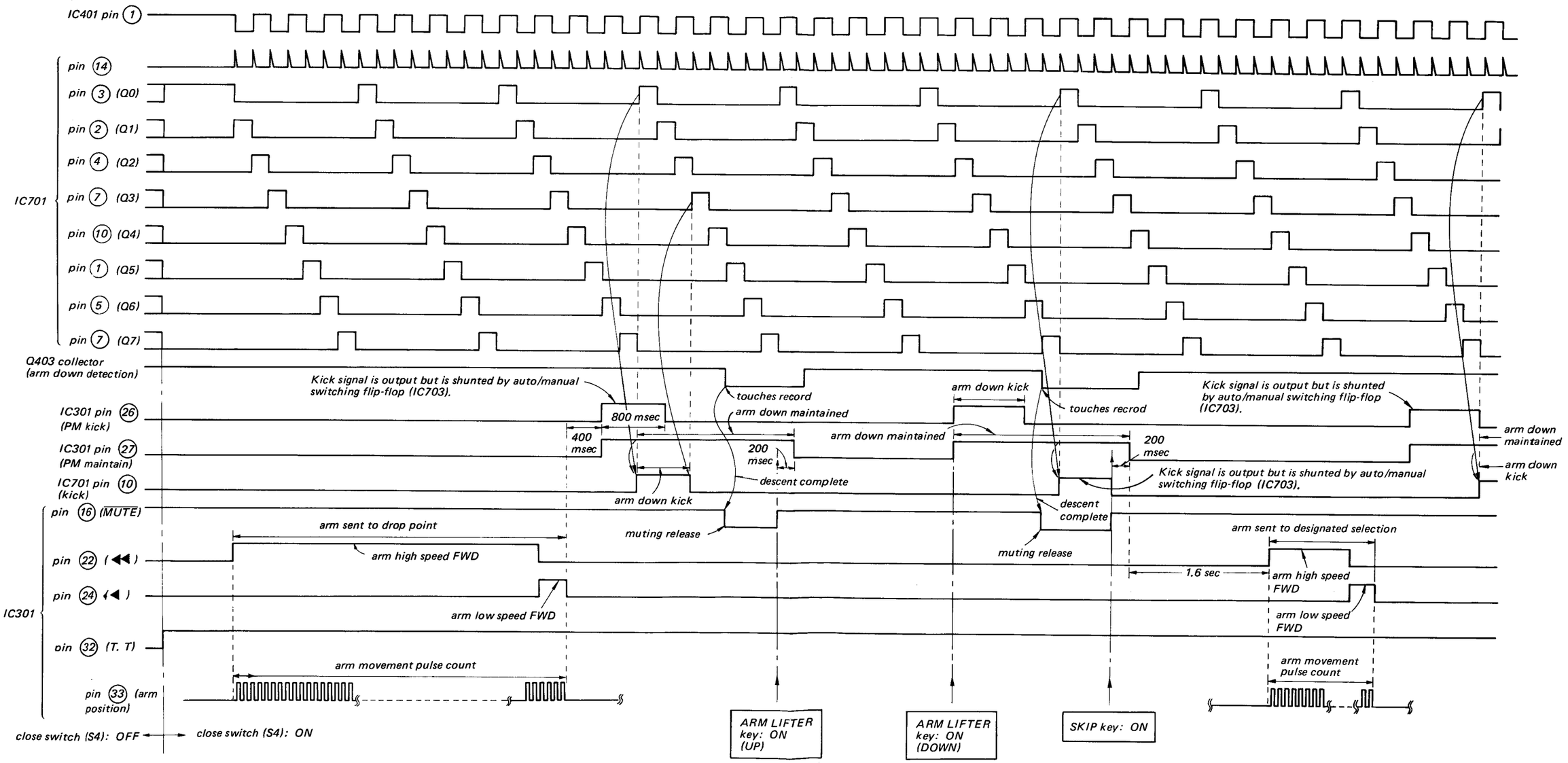


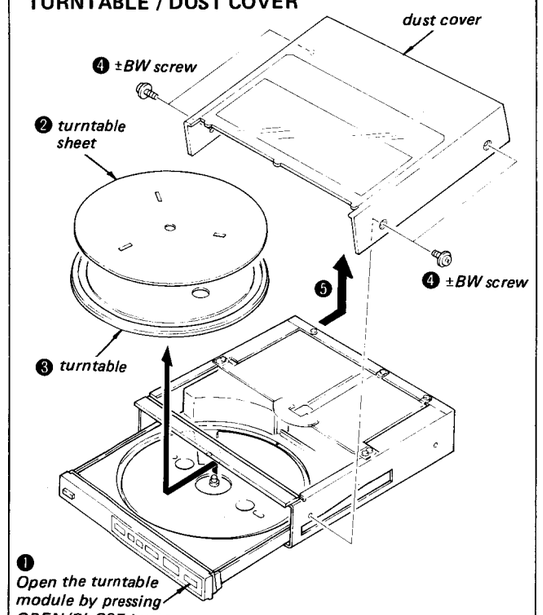
Figure 6

SECTION 2
DISASSEMBLY

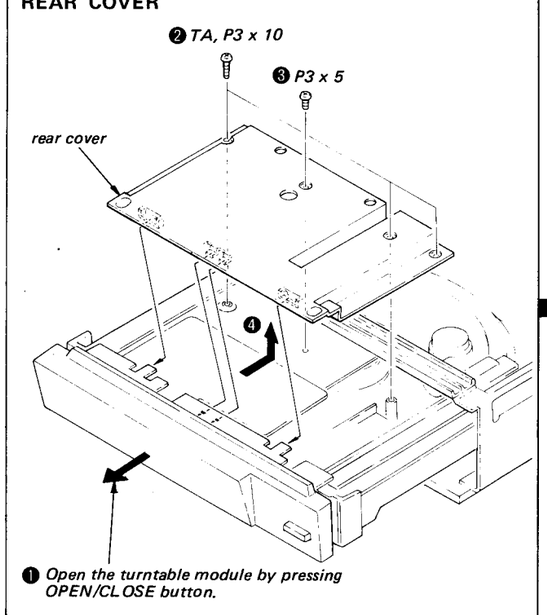
2-1. REMOVAL

Note: Follow the disassembly procedure in the numerical order given.

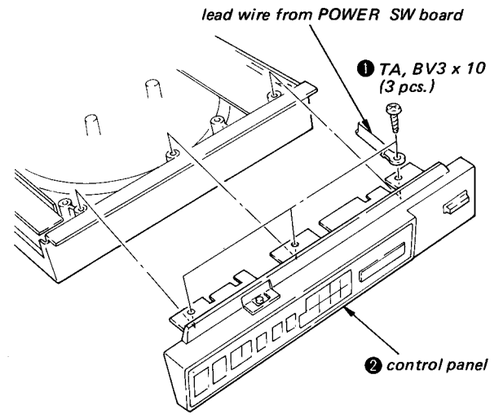
TURNTABLE / DUST COVER



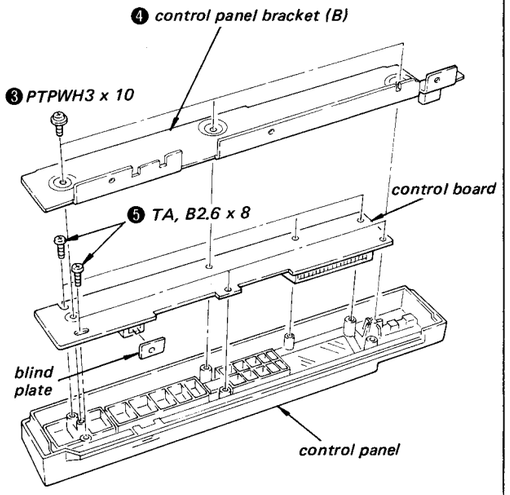
REAR COVER



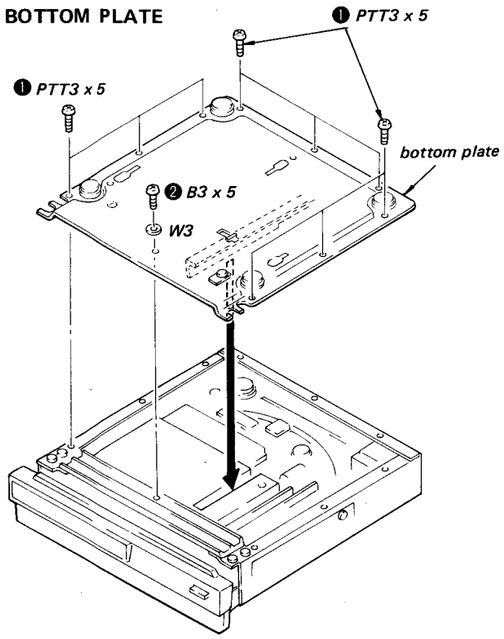
CONTROL PANEL



CONTROL BOARD



BOTTOM PLATE



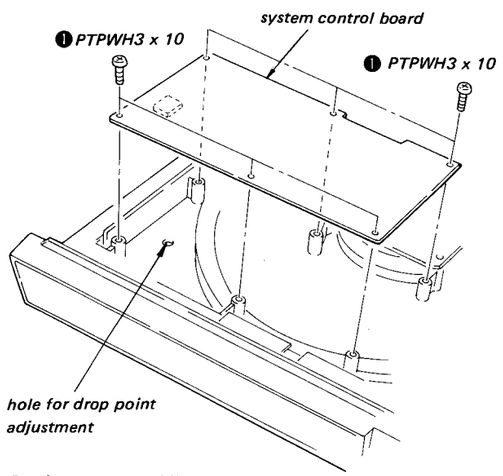
ROTOR/STATOR/SERVO AMP BOARD

(See page 33.)

- **PHONO BOARD** (See page 31.)
- **SUB BOARD** (See page 31.)
- **LOADING SENSOR BOARD/ LOADING GEAR SECTION**

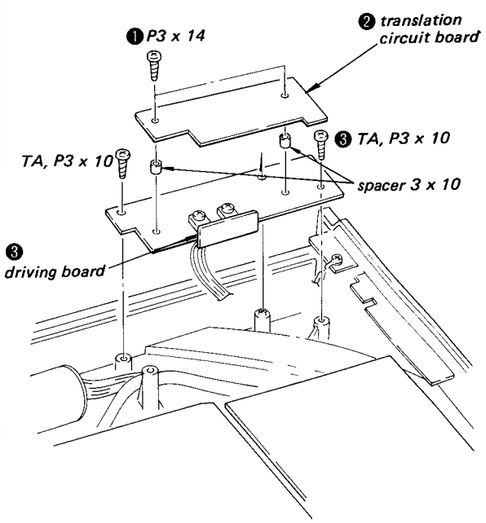
(See page 32.)

SYSTEM CONTROL BOARD

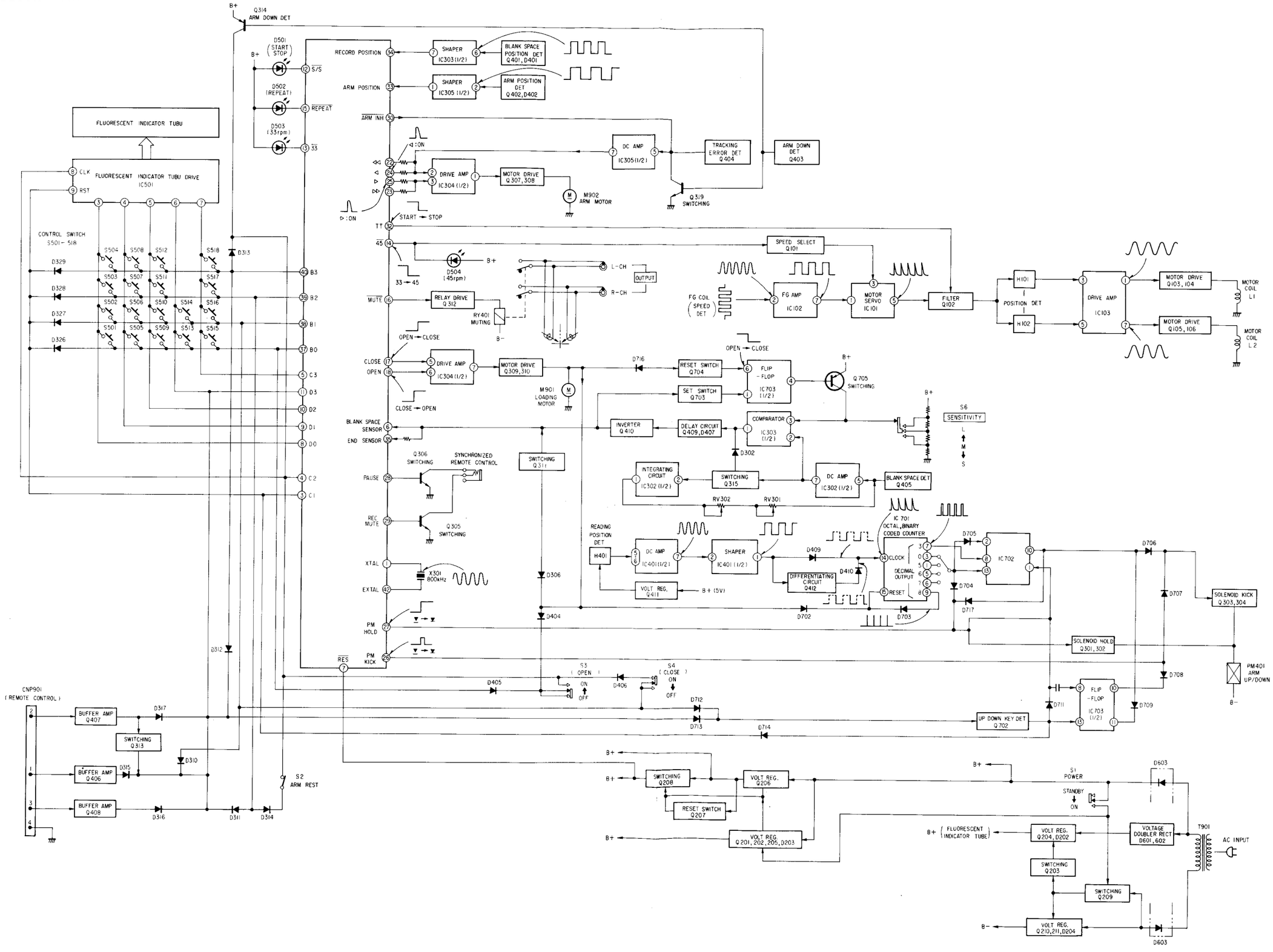


Caution on reassembling:
Be careful not to position wires over the hole.

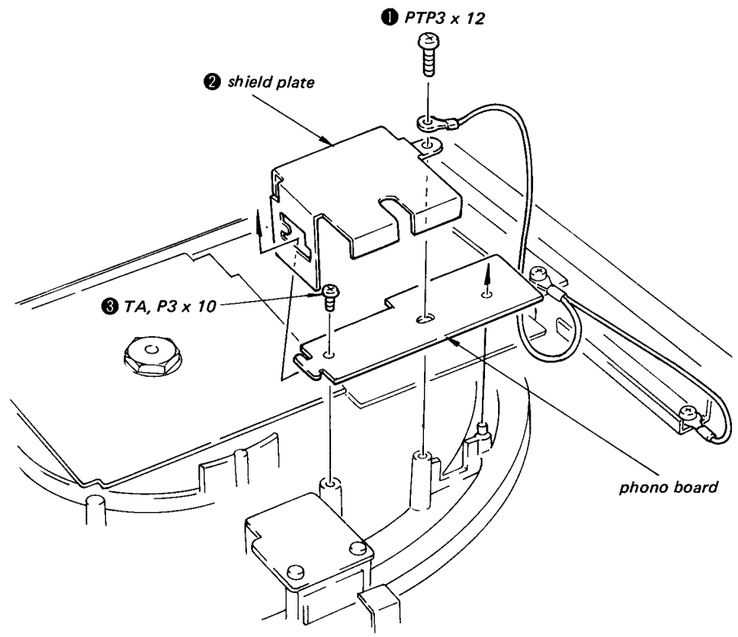
TRANSLATION CIRCUIT BOARD / DRIVING BOARD



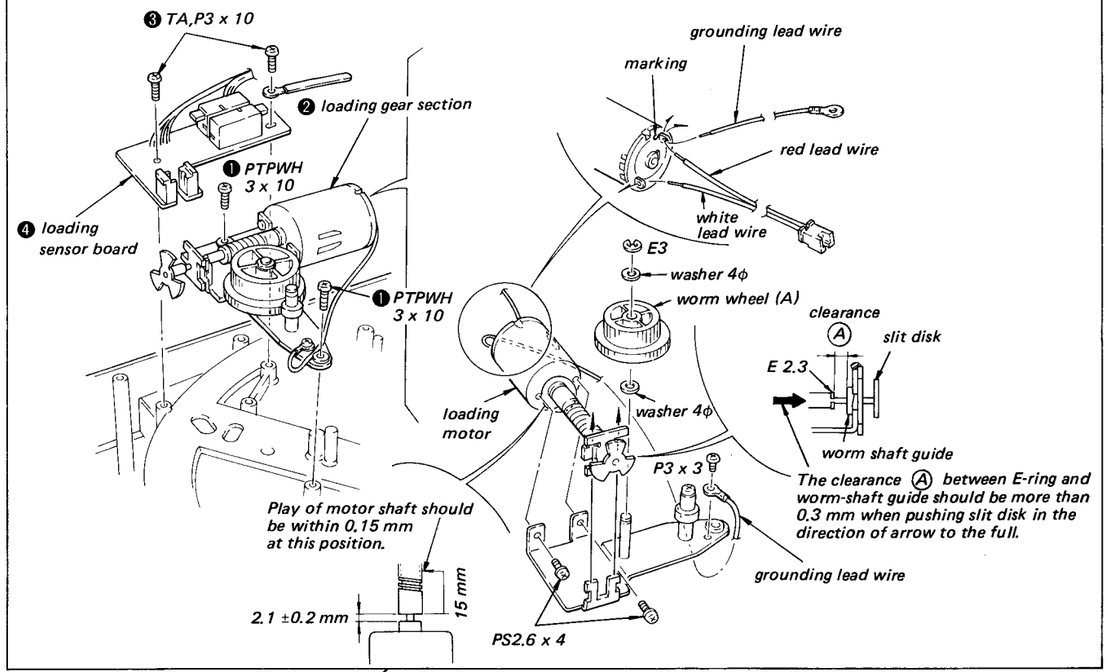
1-2. BLOCK DIAGRAM



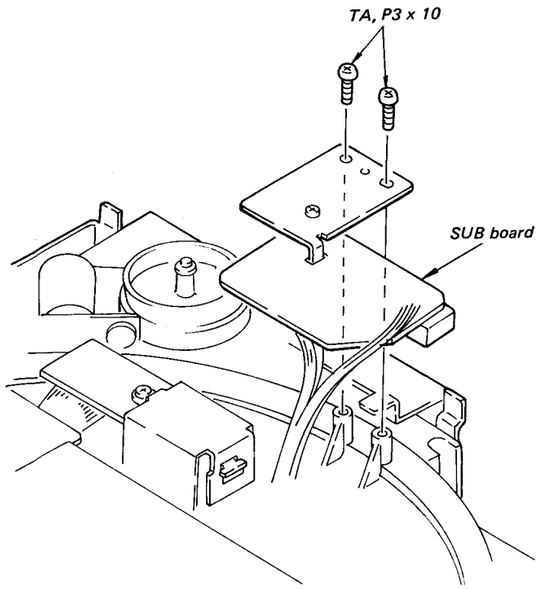
PHONO BOARD

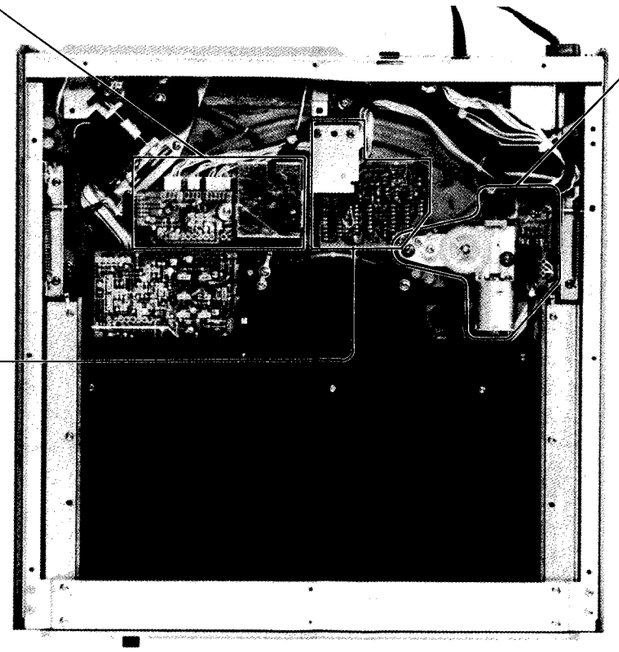


LOADING SENSOR BOARD / LOADING GEAR SECTION

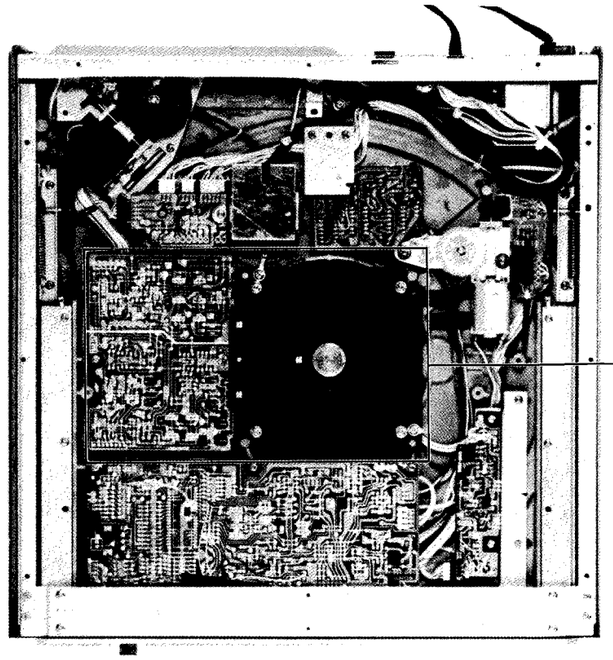


SUB BOARD





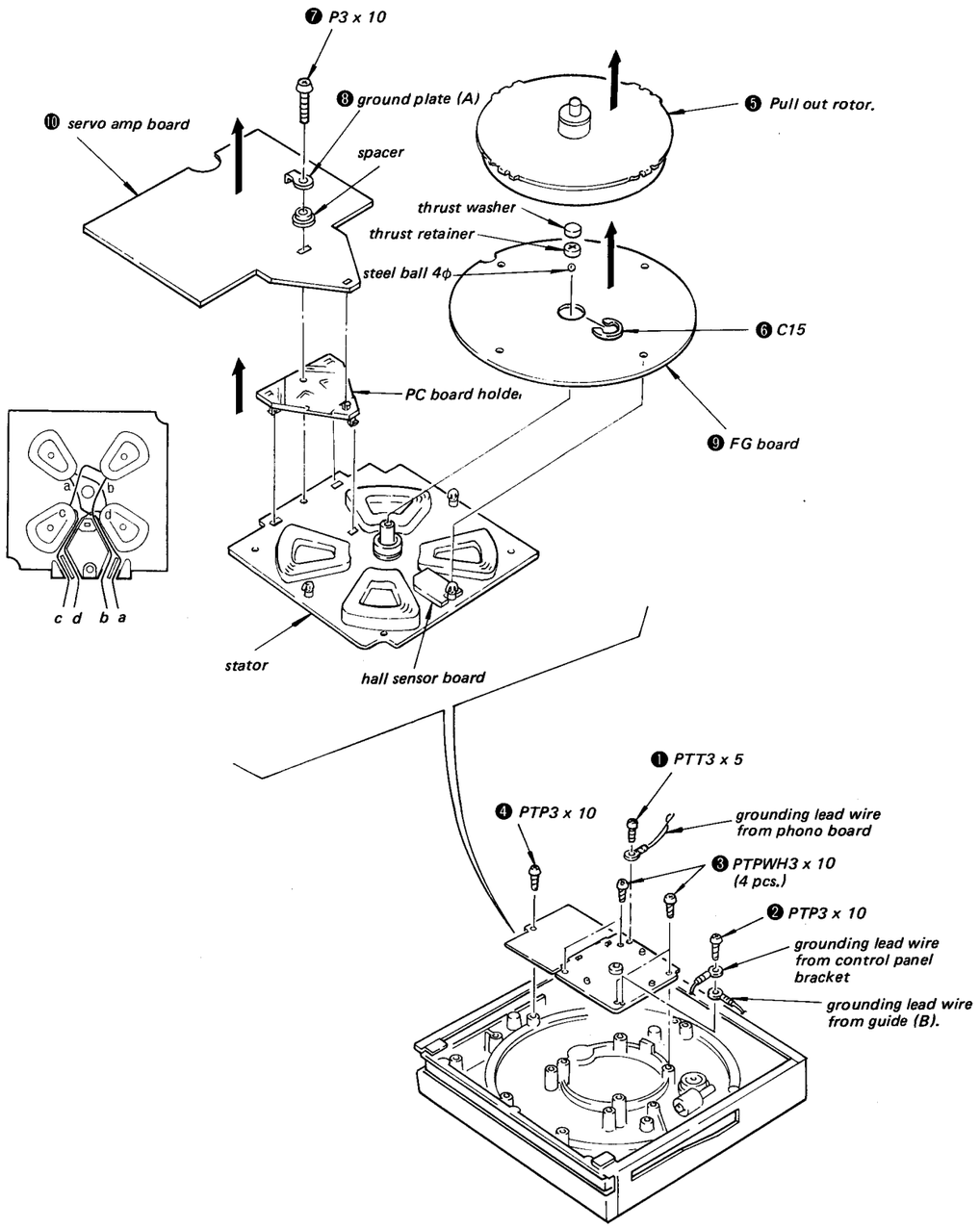
— With bottom plate removed. —



See next page.

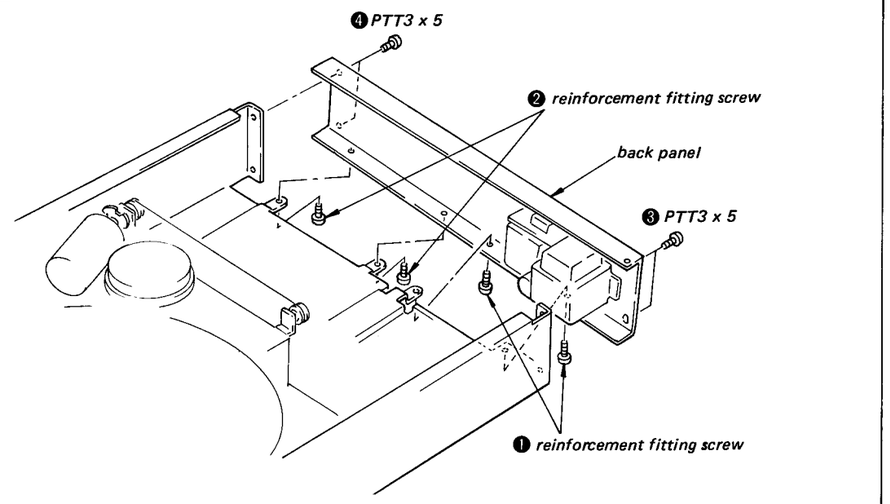
— With rear cover removed. —

ROTOR / STATOR / SERVO AMP BOARD

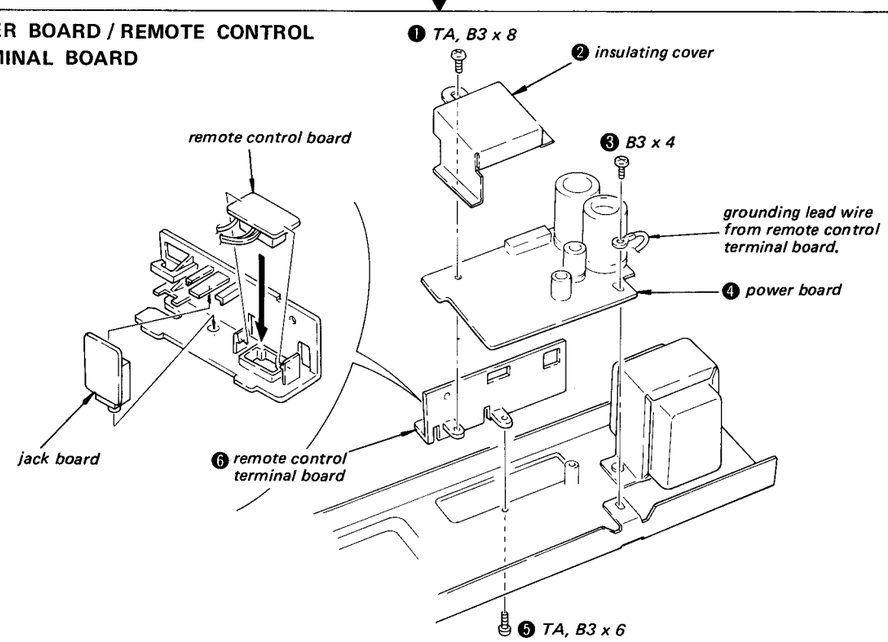


Remove bottom plate.
(See page 29.)

BACK PANEL



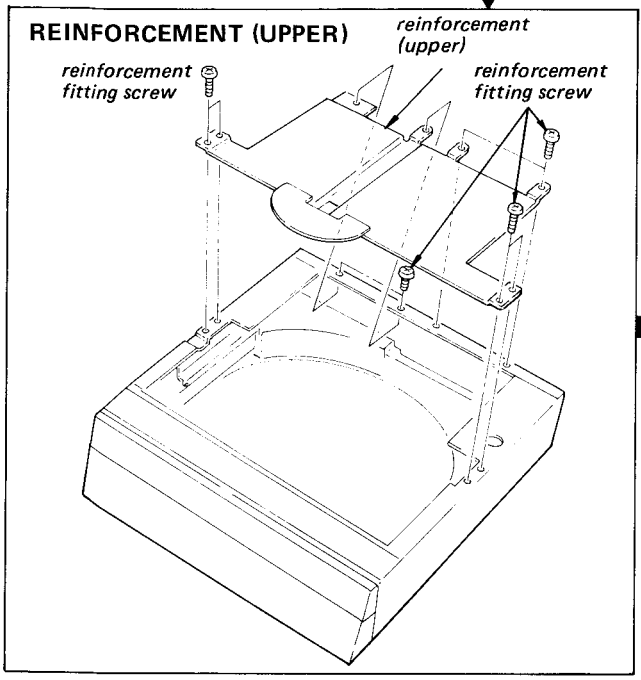
POWER BOARD / REMOTE CONTROL TERMINAL BOARD



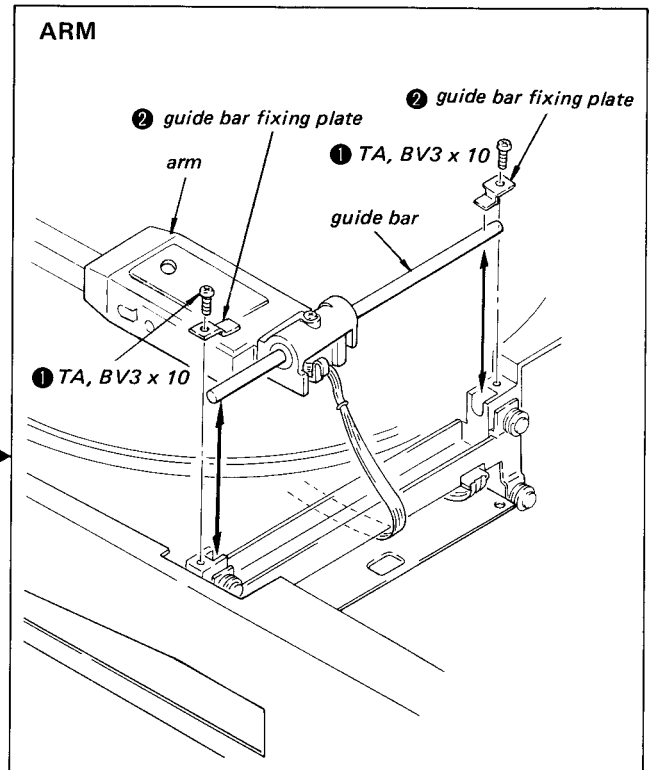
Remove dust cover.

(See page 29.)

REINFORCEMENT (UPPER)



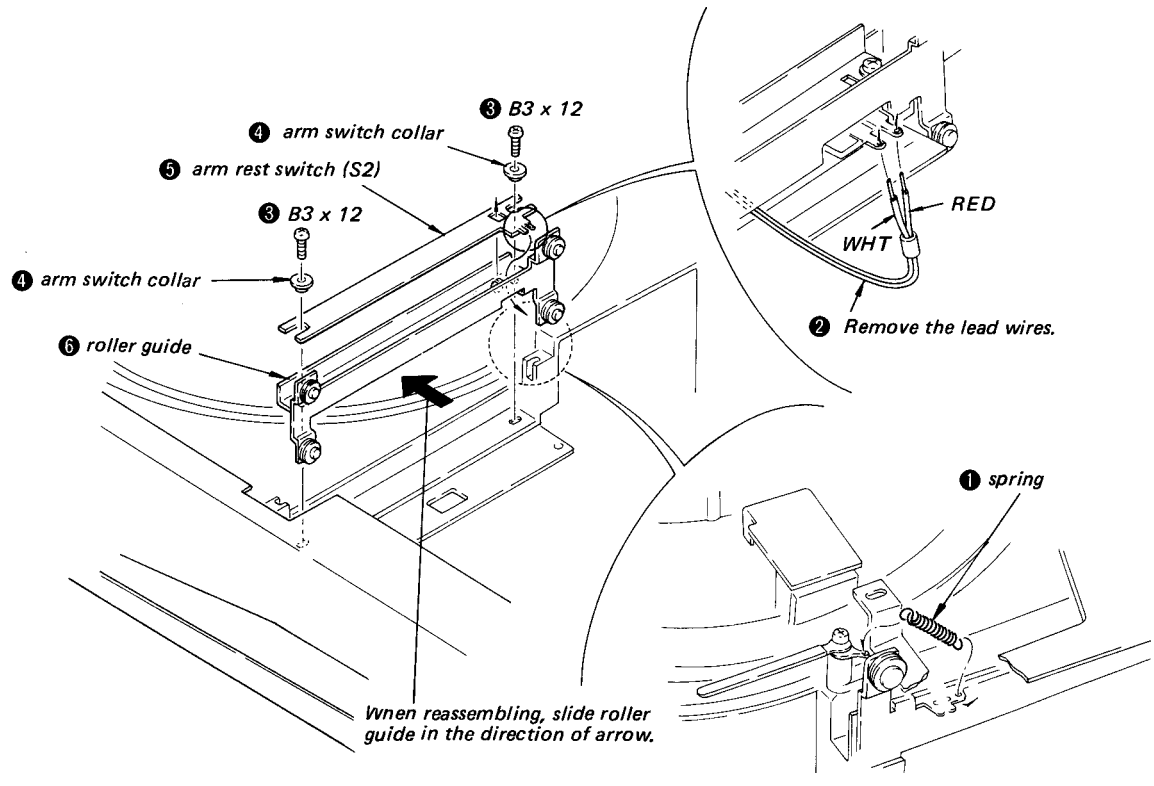
ARM



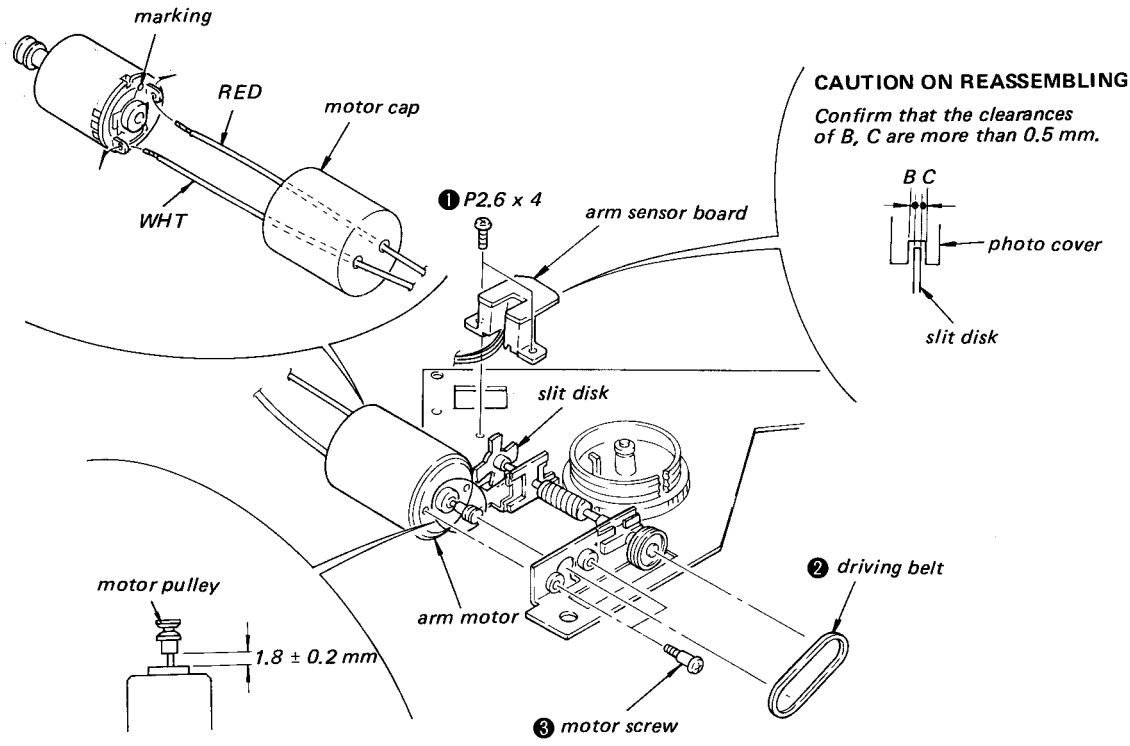
ARM DRIVE CORD STRINGING

(See page 40.)

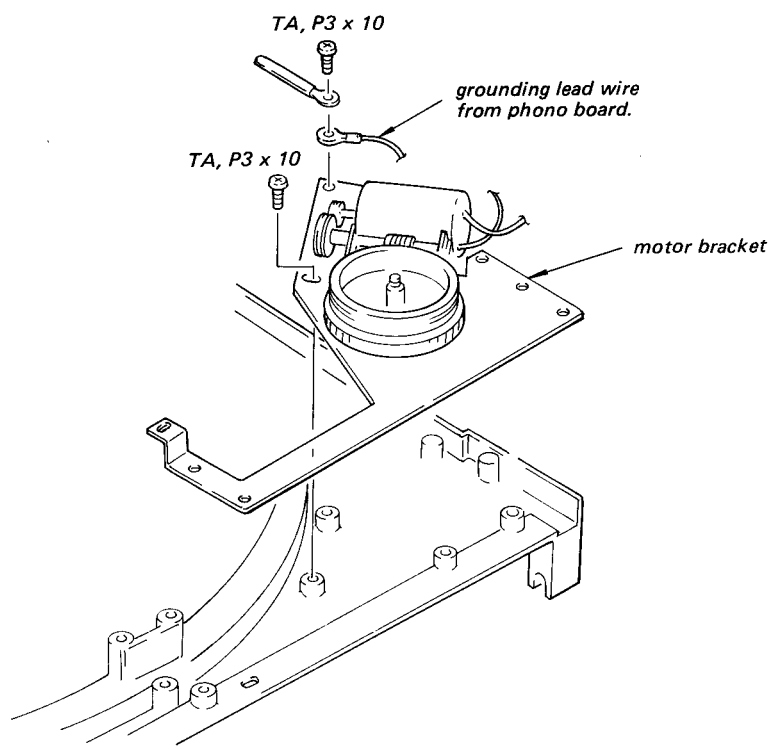
ARM REST SWITCH (S2) / ROLLER GUIDE



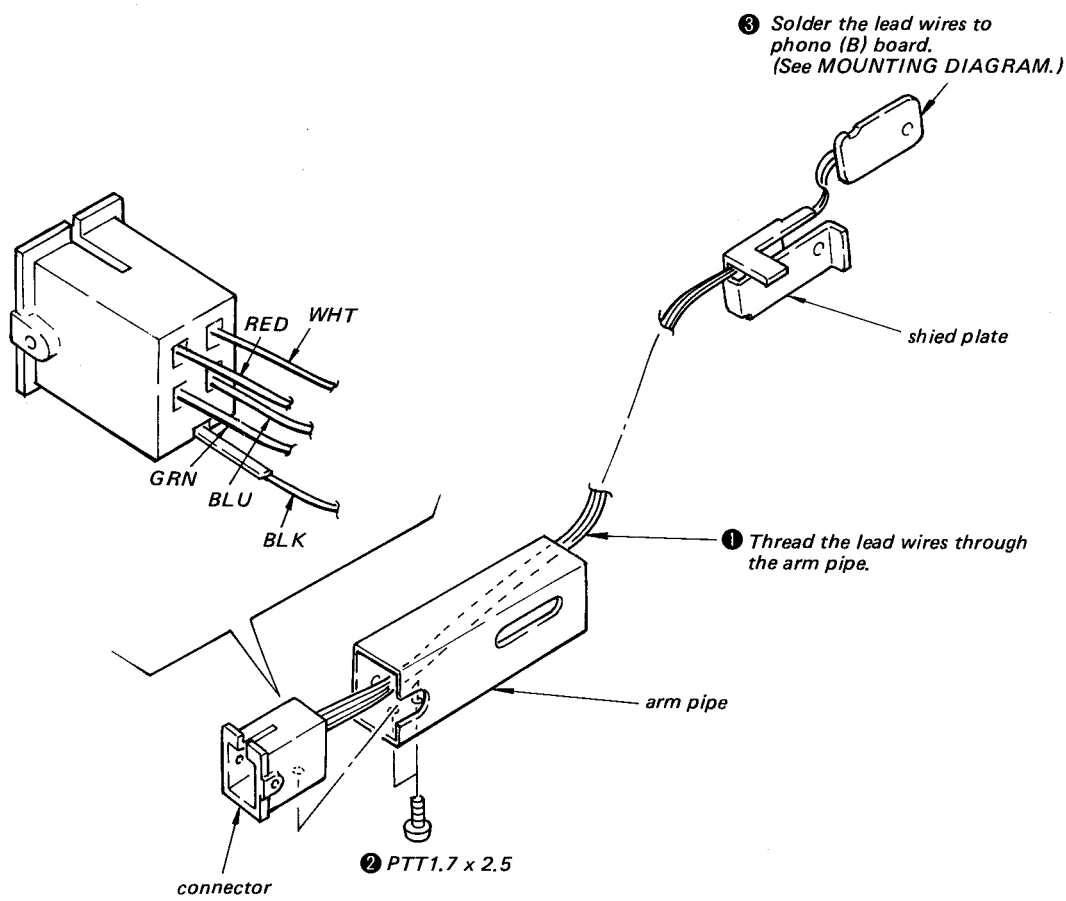
ARM MOTOR



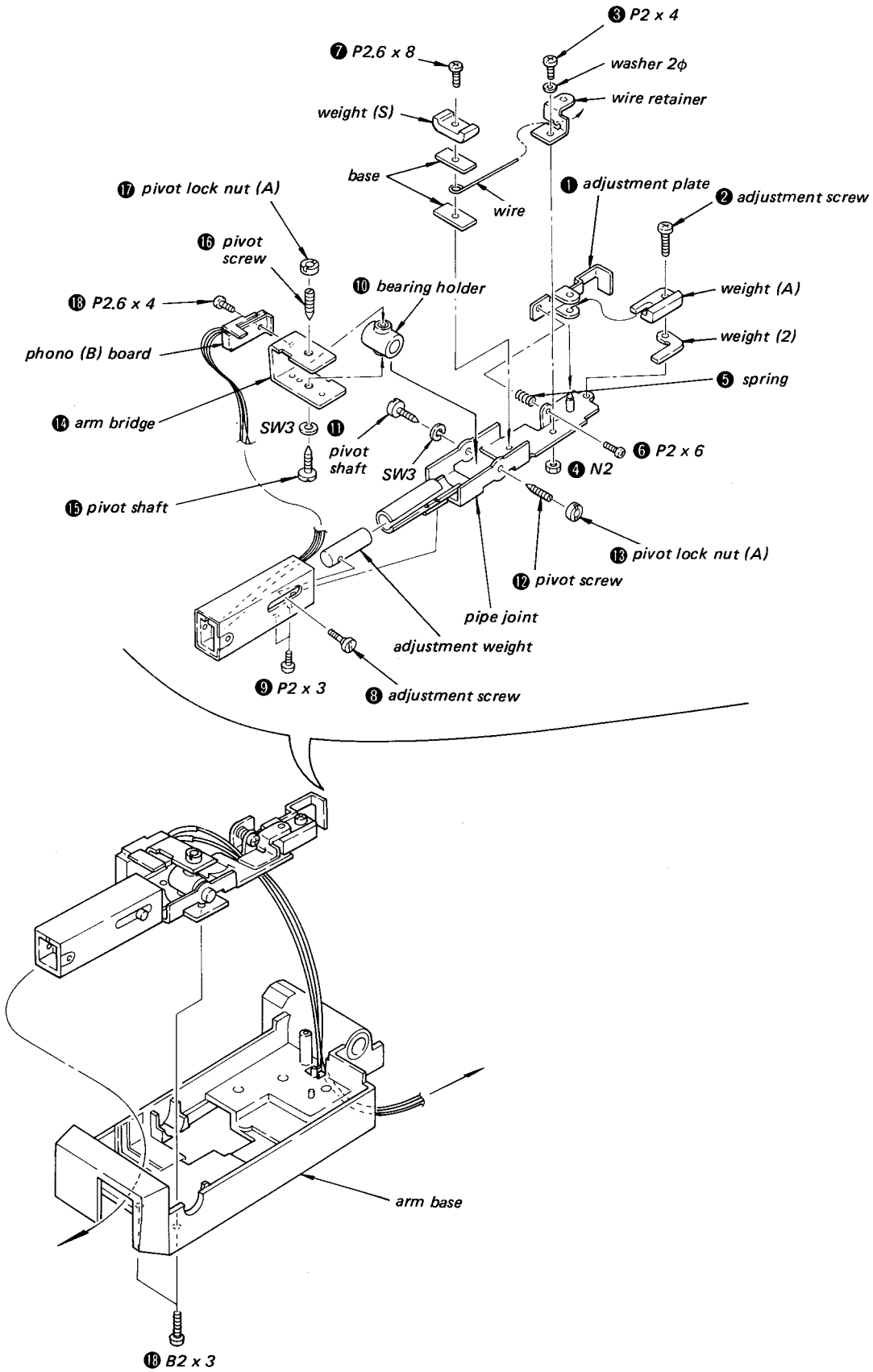
ARM MOTOR BRACKET



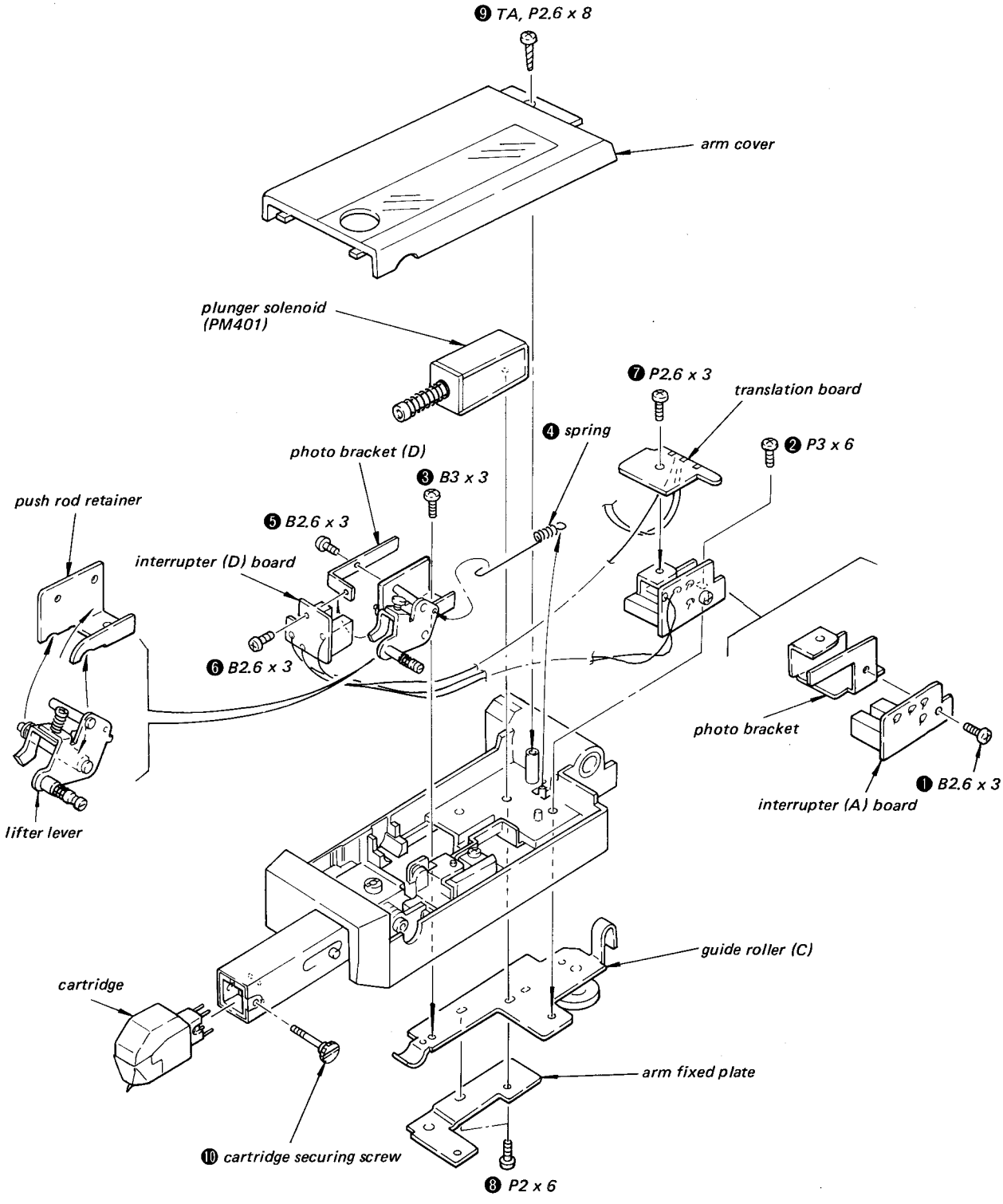
ARM ASSEMBLING (1)



ARM ASSEMBLING (2)

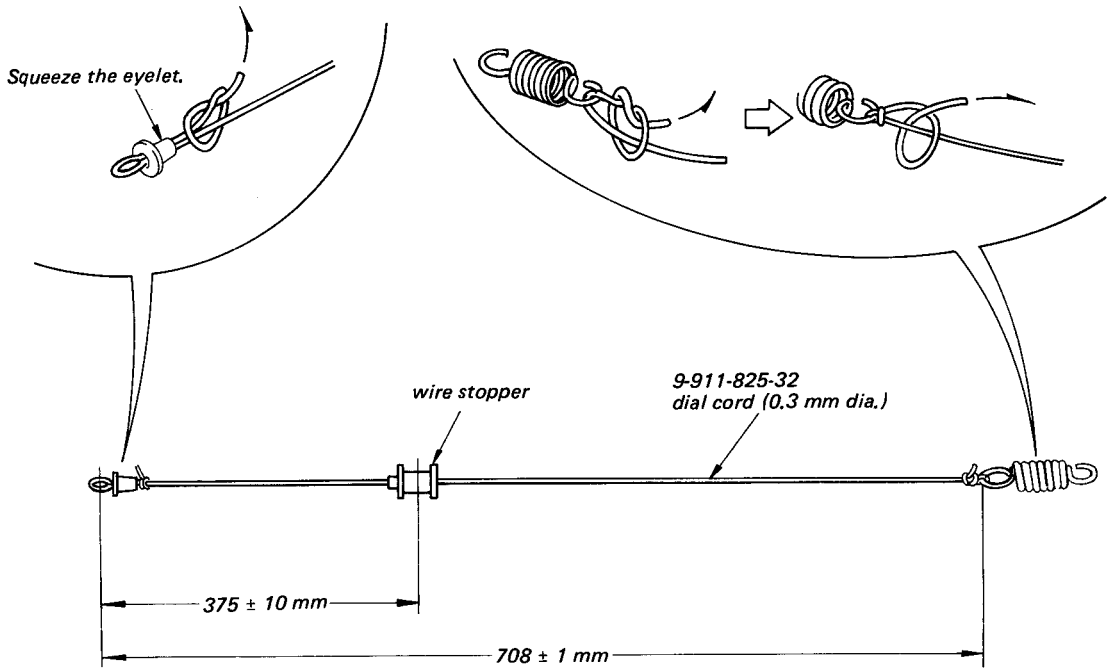


ARM ASSEMBLING (3)

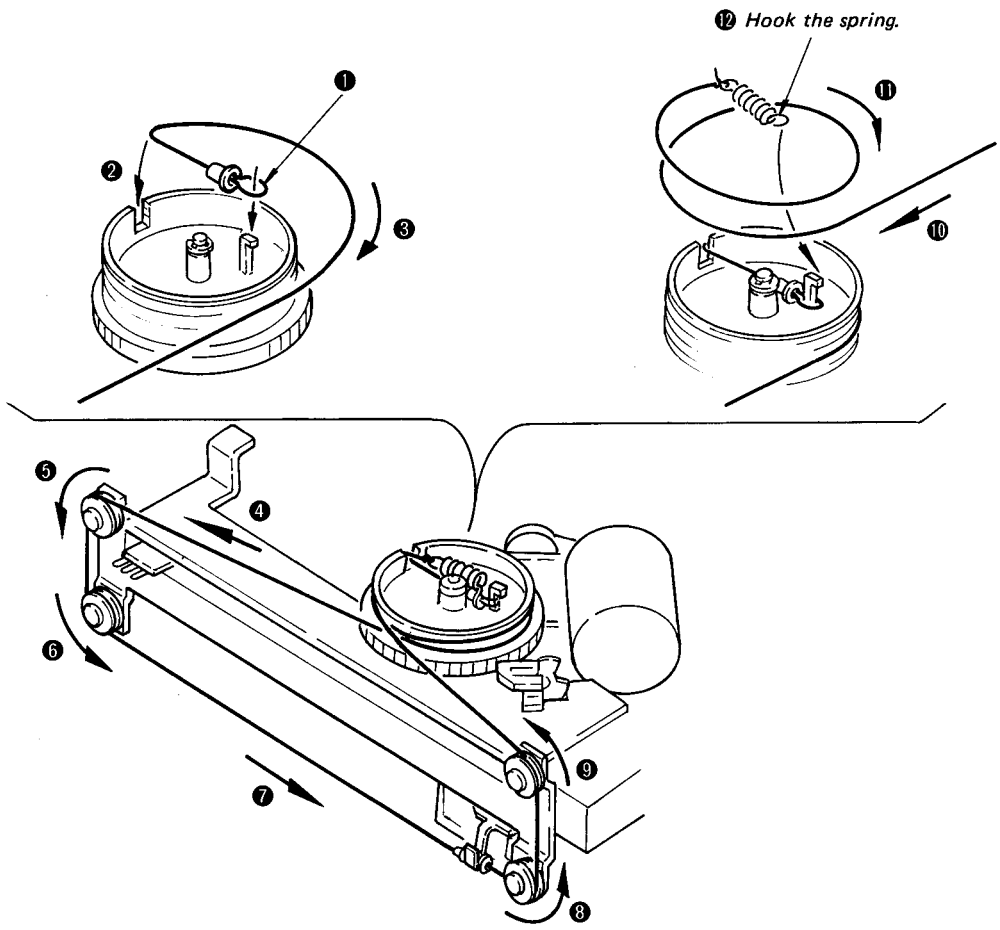


2-2. ARM DRIVE CORD STRINGING

(1) Preparation



(2) Stringing



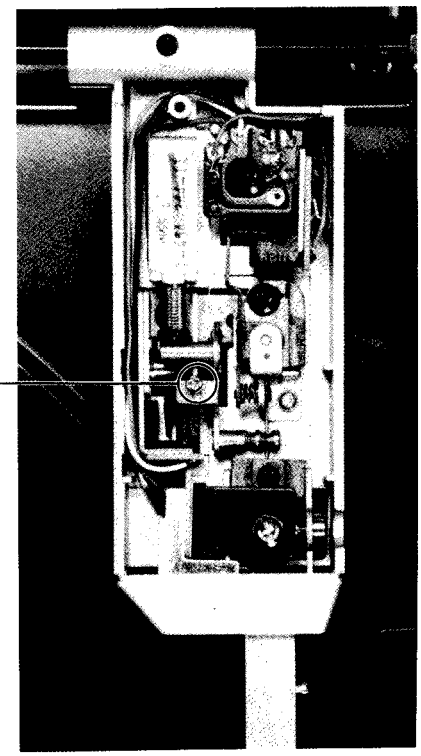
SECTION 3
ADJUSTMENTS

3-1. MECHANICAL ADJUSTMENTS

Note: The adjustment should be performed in the order given in this service manual. After the adjustments, apply suitable locking compound to the adjustment screws.

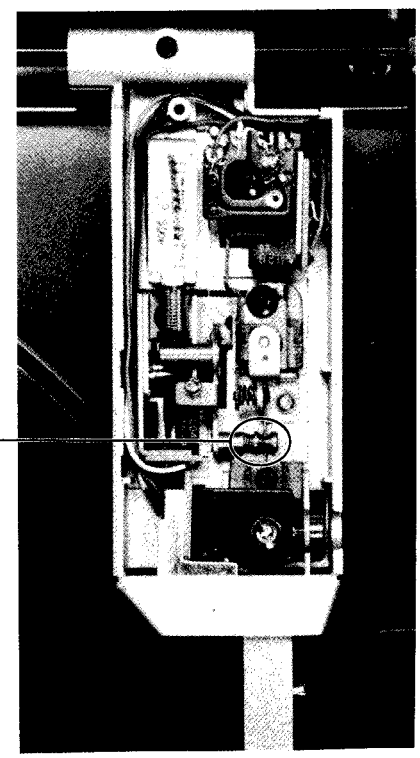
Muting Position Adjustment

1. Put a record.
2. Attach the cartridge and set the stylus force adjustment knob to the center.
3. Press ARM TRANSPORT button (◁) and move the arm over the turntable.
4. Press ARM LIFTER button (▼/▼) and adjust with the shutter adjustment screw so that sound comes out 0.5 – 1 seconds after a stylus tip drops on the record.



Arm Pipe Angle Check

1. Position the slit of arm rest switch (S2) position adjustment screw to the center. (See page 44.)
2. Put the test record (YFSC-16).
3. Press START/STOP button.
4. Adjust with the horizontal position adjustment screw so that the drop point at this time is within the specification.
   Specification: 9 – 12 counts
   Turning to the right: Count decreases.
   Turning to the left: Count increases.

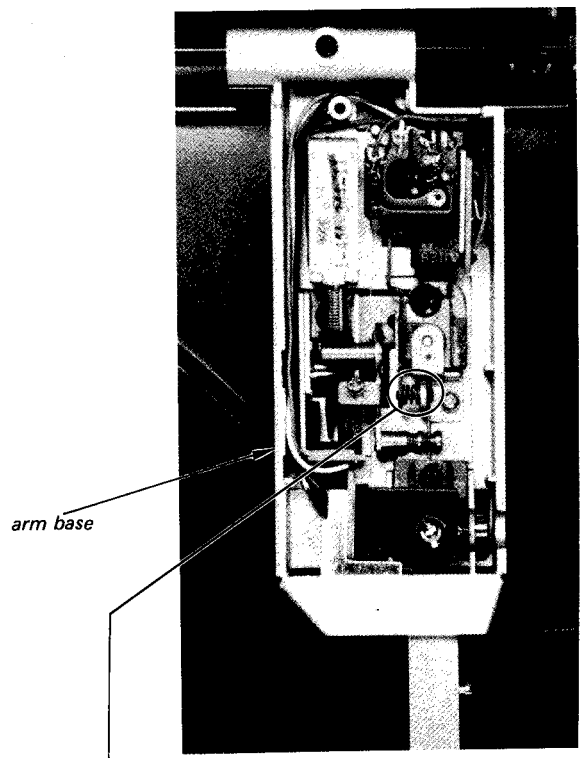


Tracking Error Adjustment

1. Place a test record (YFSC-16) on the turntable and press START/STOP button for lead-in.
2. Just after the first count appears since the arm went DOWN, cause the arm to go UP and then go DOWN again. Note the counts at these two points, and then confirm that the difference in count is within 3 counts.
   If necessary, adjust with tracking error adjustment screw.
3. After completing step (2), cause the arm to go DOWN, and then go UP just after the arm base moves.
4. Check the count at that time, and then confirm that the difference in count when the arm goes DOWN again is within 2 counts.
5. After installing the arm cover to arm base, confirm tracking error adjustment. If necessary, perform step (1) – (5).

– Adjustment Direction –

For (2) when arm base moves, turn to the right.
For (4) when the difference in count is too large, turn to the left.



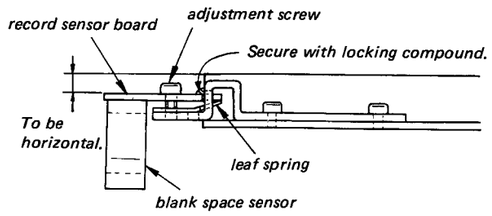
Blank Space Sensor Adjustment

This adjustment should be performed only when the followings have been done.

- When assembling blank space sensor section:
- When replacing photo coupler of blank space sensor:

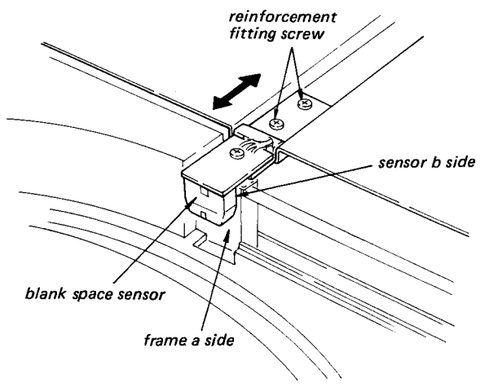
1. Blank Space Sensor Inclination Adjustment

1) Press OPEN/CLOSE button and open the turntable module.
2) Adjust with the adjustment screw so that record sensor board is horizontal.



2. Blank Space Sensor Position Adjustment

1) Press OPEN/CLOSE button and open the turntable module.
2) Move the blank space sensor in the direction of arrow so that the clearance between frame a-side and rear side of blank space sensor (b-side) is 0.5 – 1 mm and tighten the reinforcement fitting screws.



3. Blank Space Sensor Voltage Adjustment

Setting:

SENSITIVITY switch: H

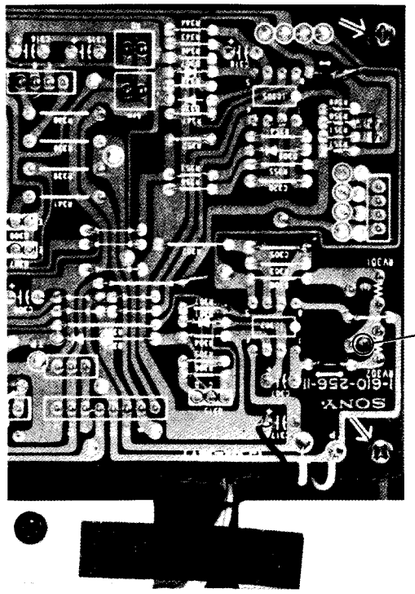
1) Put the test record (YFSC-16).
2) Press OPEN/CLOSE button and close the turntable module.
3) Adjust RV302 so that the indication on the display at this time is within the specification.

Note: This adjustment should be peformed for both A side and B side of the test record (YESC-16).

Specifications:

A side: 6 – 7
B side: 13 – 14

– system control board (conductor side) –

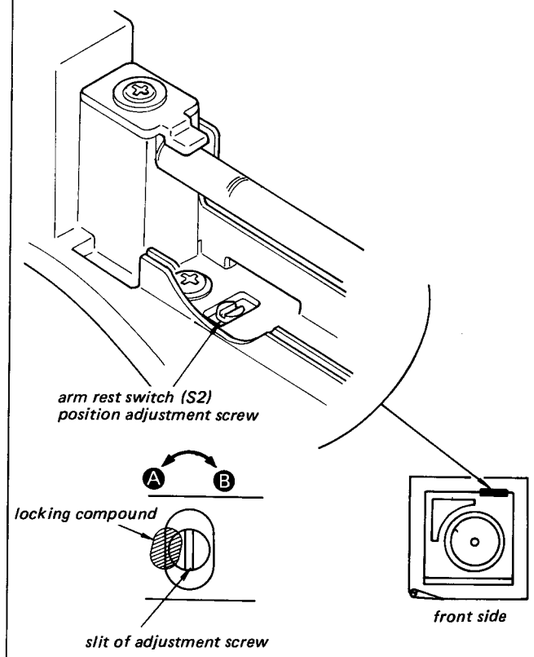


Drop Point Adjustment

1. Put the test record (YFSC-16).
2. Press START/STOP button.
3. Adjust with the adjustment screw so that the drop point at this time is within the specification.

Test Record	Specification
YFSC-16 (30 cm)	6-16 count

4. After adjustment, apply suitable locking compound as shown in the figure. (Do not apply locking compound on the screw slit.)



- *The position in the figure above is the center of adjustment screw.*

Ⓐ *The count increases. (The stylus moves toward inner grooves.)*
Ⓑ *The count decreases. (The stylus moves outer grooves.)*

Note: This adjustment screw turns 360° and has no stoppers.

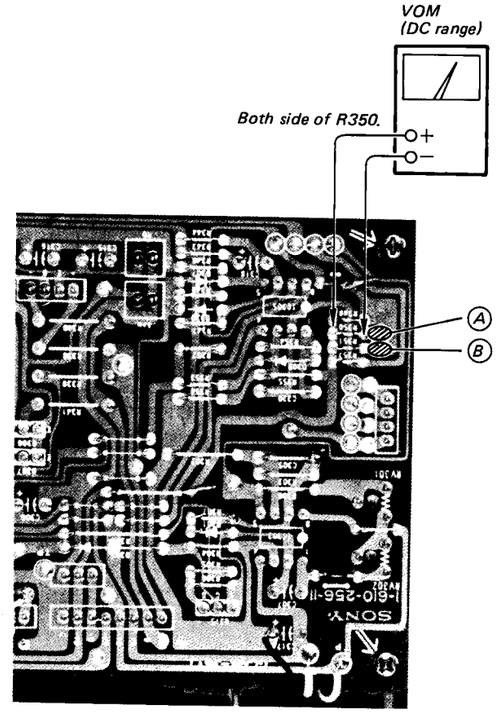
Arm Interrupter Adjustment

1. Press OPEN/CLOSE button and open the turntable module.
2. Solder the pattern Ⓐ. If the pattern Ⓑ is soldered, unsolder the pattern Ⓑ.
3. Set the arm fully rightward.

   (Be sure that the interrupter for tracking error detection is fully opened.)
4. Read the voltage on the VOM.
   - If the reading is 0.3 – 0.6 V, unsolder the pattern Ⓐ.
   - If the reading is more that 0.6 V, unsolder the pattern Ⓐ and solder the pattern Ⓑ.

Adjustment Location:

– system control board –

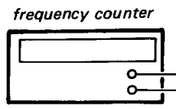


. ELECTRICAL ADJUSTMENTS

- Perform the adjustments with the set operating normally.
- In this set, the voltage is applied to the power supplying line (±21 V) even if the POWER switch is turned OFF. When repairing the unit, unplug the power cord with the POWER switch ON (to discharge electrolytic capacitor after rectifying AC power supply voltage).
- Repeat the procedure 2 – 3 times.

Turntable Speed Adjustment

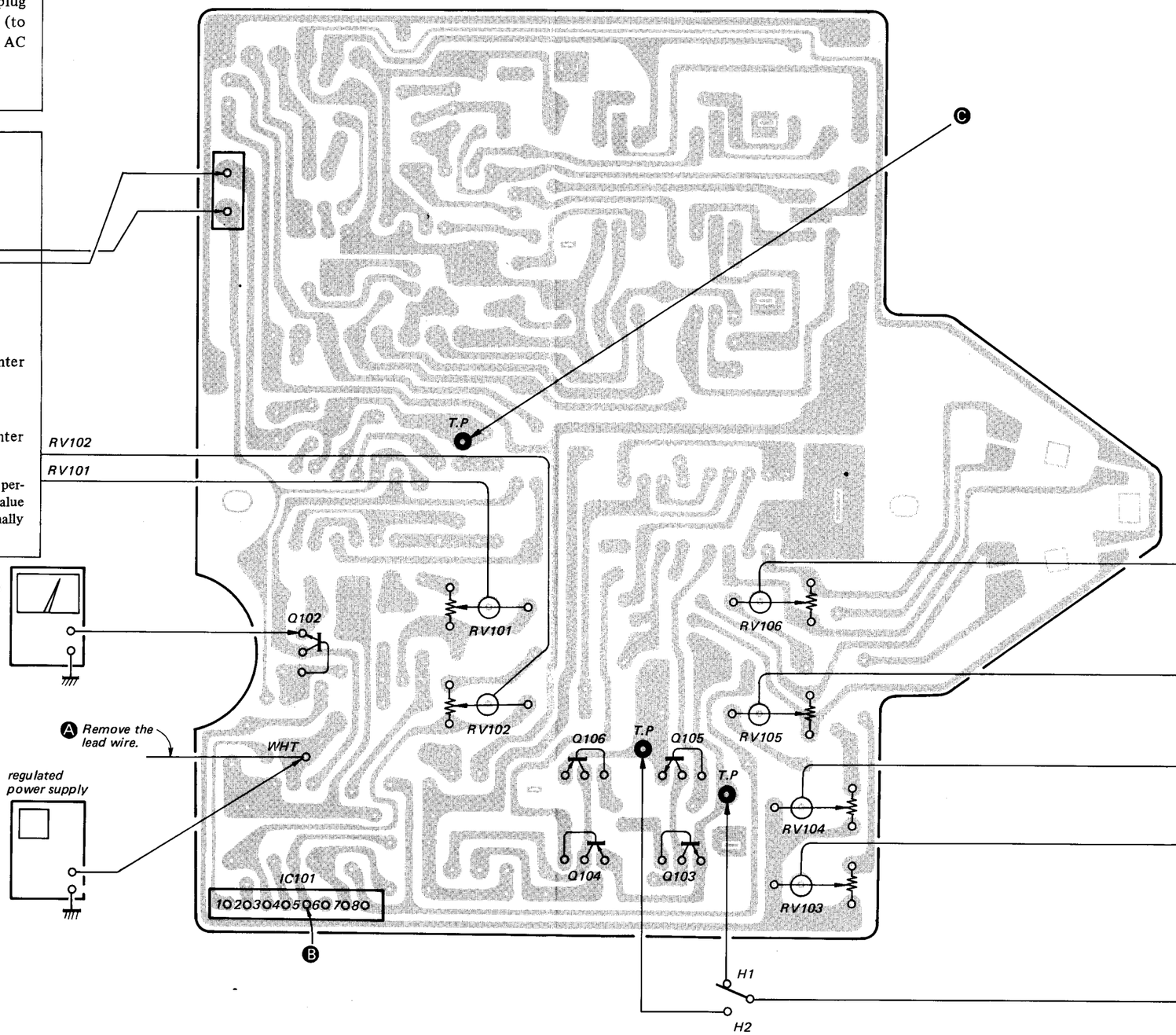
1. Connect frequency counter to test point.



2. POWER switch : ON
   START switch: ON
   SPEED switch: 45 rpm
3. Adjust RV102 so that the frequency counter reading is 96.00 – 96.38 Hz.
4. SPEED switch: 33 rpm
5. Adjust RV101 so that the frequency counter reading is 71.11 – 71.39 Hz.

Note: When the adjustment of 45 rpm (RV102) is performed, it makes a difference of adjustment value of 33 rpm. So, the adjustment should be finally done by 33 rpm (RV101).

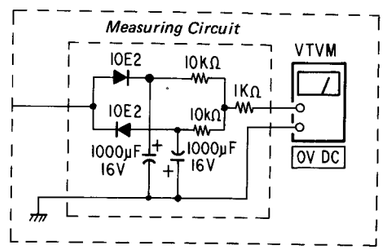
[SERVO AMP BOARD]



Gain/Offset Adjustment

1. Remove the lead wire Ⓐ for the turntable driving signal from system control IC.
2. Connect the pattern Ⓑ to Ⓒ, and apply regulated power supply to the lead wire Ⓐ.
3. Connect a VOM to the emitter of Q102, and adjust the regulated power supply voltage for DC1.5 V.
4. Adjust RV103 (H1) and RV104 (H2) so that the emitter voltage of Q103, 104 (H1) and Q105, 106 (H2) are 5 Vp-p. . . . . Gain Adjustment
5. Adjust RV105 (H1) and RV106 (H2) so that the emitter waveforms of Q103, 104 (H1) and Q105, 106 (H2) are as shown below (or so that DC potential is 0 V). . . . . Offset Adjustment
6. After adjustment, remove the lead wire connecting pattern Ⓑ to Ⓒ and solder the lead wire Ⓐ.

Note: Set the sweep time longer for easy waveform checking.



TRICAL ADJUSTMENTS

n the adjustments with the set operating y.

set, the voltage is applied to the power ng line (±21 V) even if the POWER switch d OFF. When repairing the unit, unplug ver cord with the POWER switch ON (to ge electrolytic capacitor after rectifying AC upply voltage).

the procedure 2 – 3 times.

Speed Adjustment

t frequency counter to test point.

frequency counter

switch : ON
switch: ON
switch: 45 rpm

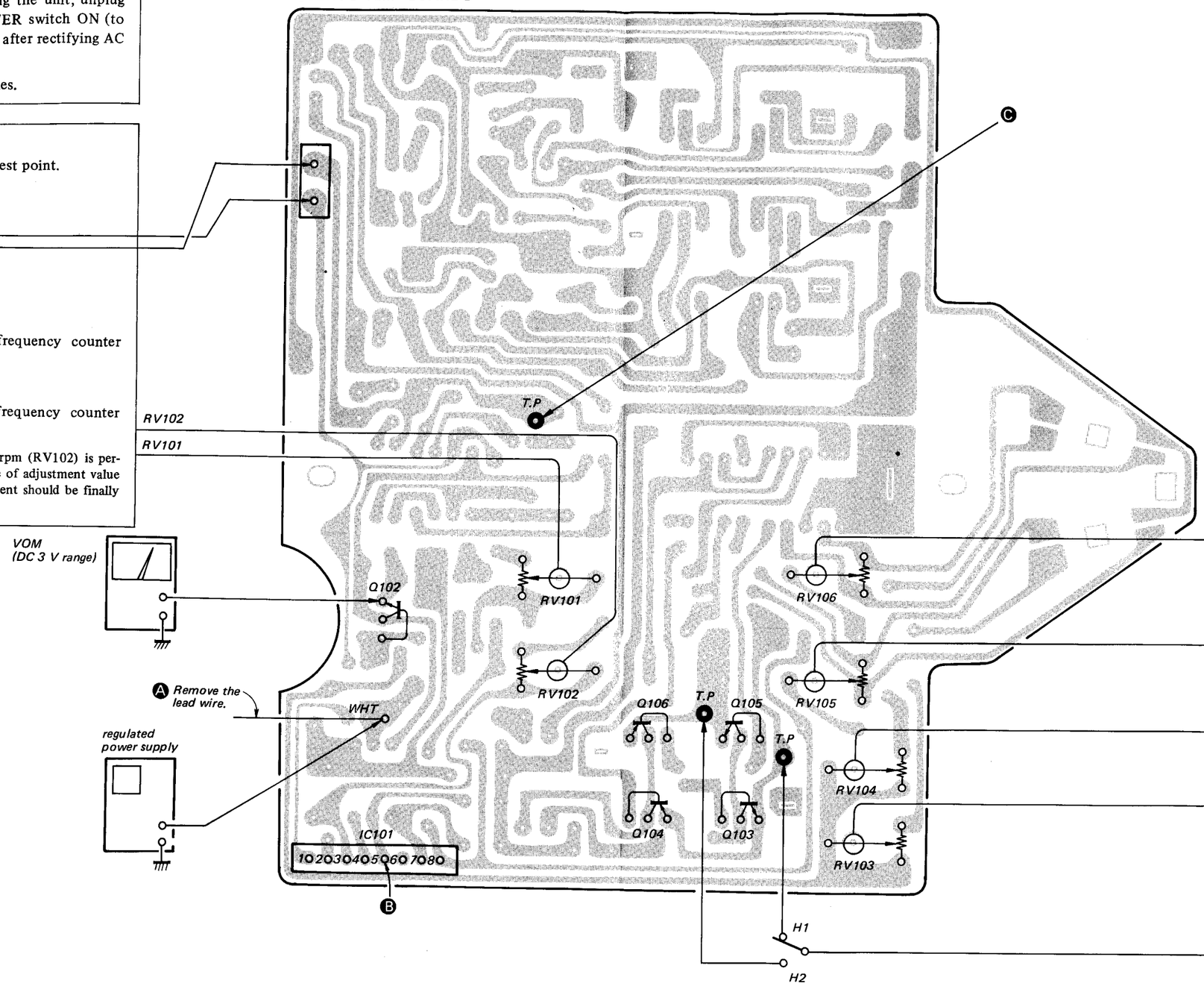
RV102 so that the frequency counter s 96.00 – 96.38 Hz.

witch: 33 rpm

RV101 so that the frequency counter s 71.11 – 71.39 Hz.

en the adjustment of 45 rpm (RV102) is per-med, it makes a difference of adjustment value 33 rpm. So, the adjustment should be finally ne by 33 rpm (RV101).

【SERVO AMP BOARD】



Gain/Offset Adjustment

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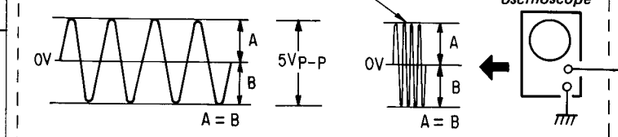
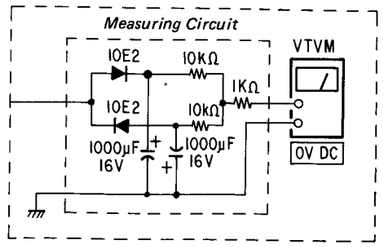
2. Connect the pattern Ⓑ to Ⓒ, and apply regulated power supply to the lead wire Ⓐ.
3. Connect a VOM to the emitter of Q102, and adjust the regulated power supply voltage for DC1.5 V.
4. Adjust RV103 (H1) and RV104 (H2) so that the emitter voltage of Q103, 104 (H1) and Q105, 106 (H2) are 5 Vp-p. . . . . Gain Adjustment
5. Adjust RV105 (H1) and RV106 (H2) so that the emitter waveforms of Q103, 104 (H1) and Q105, 106 (H2) are as shown below (or so that DC potential is 0 V). . . . . Offset Adjustment
6. After adjustment, remove the lead wire connecting pattern Ⓑ to Ⓒ and solder the lead wire Ⓐ.

Note: Set the sweep time longer for easy waveform checking.



Measuring Circuit



Q , D

Q405

Q406 408
D403

Q402

D402

D401

Q404
Q401

D404 406

Q403

【JACK BOARD】

J901 (SYNCHRONIZED REMOTE) CONTROL TERMINAL

【RECORD SENSOR BOARD】

RECORD

TO ARM MOTOR BRACKET

TO PANEL LIFTER BRACKET (RIGHT)

TO GUIDE (C)

R-CH

L-CH

【REMOTE CONTROL BOARD】

(CHASSIS)

CNP901

(REMOTE CONTROL)

【ARM SENSOR BOARD】

【LOADING SENSOR BOARD】

【INTERRUPTER (A) BOARD】

【INTERRUPTER (D) BOARD】

【TRANSLATION BOARD】

PM401 ARM UP / DOWN

TO EXIST 8 LINES.

SHIELD CASE

【PHONO BOARD】

【PHONO(B)BOARD】

CARTRIGE CONNECTOR

S2 ARM REST SWITCH

POSITION

TERMINAL NO.

S5 CODE TABLE (1 : ON)

TERMINAL NO.	POSITION 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1																
2																
4																
8																

Q

309

310

【DRIVING BOARD】

【SYSTEM CONTROL BOARD】

IC301

IC303

IC304

CP302

S5 DP ADJUST

Q , IC

313 314 312 319 IC301 304 302 306 305 311 IC304 303 301 IC303 308 307

D

315 316 317 310 311 312 314 313 322 323 324 325 321 320 319 318 329 328 327 326 309 306 305 304

【CONTROL BOARD】

D501 (START/STOP)

S513 OPEN/CLOSE

S512 START/STOP

S6 SENSITIVITY H ← M → L

S514 ARM LIFTER

S516 REPEAT

S515 SPEED

S511 SKIP

S518 S517 ARM TRANSPORT

D502 (REPEAT) D503 (33) D504 (45)

D506 D507 D508 D509

S501 S502 S503 S504 S505 S506 S507 S508 S509 S510

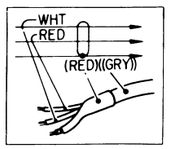
(CHASSIS)

D IC

501 509 508 502 507 503 504 506

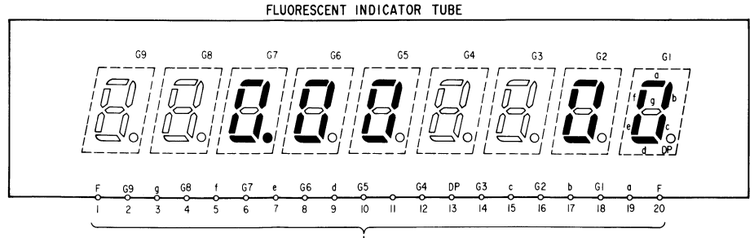
Note:

- Color code of sleeving over the end of the jacket.



- ○— : parts extracted from the component side.
- ●— : parts extracted from the conductor side.
- * : transistor with resistor
- : B + pattern

FLUORESCENT INDICATOR TUBE



L M N O P Q R S T U V W X Y Z A1 B1

POSITION

S5 CODE TABLE (1 : ON)

TERMINAL NO.	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1		●		●		●		●		●		●		●		●
2			●	●			●	●			●	●			●	●
4					●	●	●	●					●	●	●	●
8									●	●	●	●	●	●	●	●

S2 ARM REST SWITCH

Q	
309	
310	

【DRIVING BOARD】

M901 LOADING MOTOR — OPEN : −8V, CLOSE : 7.6V — BLK, RED, WHT — TO LOADING GEAR BRACKET

M902 ARM MOTOR — RED, WHT — ▷ : 4V, ◁ : 3.9V

【POWER SWITCH BOARD】

S1 POWER ON STANDBY — 21.5V — BLK — (CHASSIS)

【SERVO AMP BOARD】

【SYSTEM CONTROL BOARD】

Q · IC	
	313 314 312 319 IC301 304 302 306 305 IC304 303 301 IC303 311 308 307 IC305 315 IC302
D	315 316 317 310 311 312 314 313 322 323 324 325 321 320 319 318 329 328 327 326 309 306 305 304 307 308 302 301

【SUB BOARD】 (NEW TYPE)

Q · IC	
	IC701 IC702 701,702 704 705 703 IC703
D	702,716 701 703 704 706 709,708 710 711 717 715 712 713 714

(FORMER TYPE) 【SUB BOARD】

Q · IC	
	IC701 IC702 701 702 704 705 703 IC703
D	716 702 701 703 704 705 707 706 709,708 710 711 714 712 713

【POWER BOARD】

T901 POWER TRANSFORMER

VIO (AEP MODEL) RED (UK MODEL)

AC INPUT

RED (AEP MODEL) VIO (UK MODEL)

AEP, UK MODEL

Q · IC	
	IC101 IC102 IC103 101 102 104 105 106 103 201 202 203 204 205 206 207 208 209 210 211
D	202 201,204 205 203

D	
	603 602 601

R S T U V W X Y Z A1 B1 C1 D1 E1 F1 G1

1 2 3 4 5 6 7 8 9 10

M901 LOADING MOTOR
BLK
RED
WHT
TO LOADING GEAR BRACKET
M902 ARM MOTOR
RED
WHT
▷ : 4V
◁ : 3.9V

【POWER SWITCH BOARD】
S1 POWER ON STANDBY
21.5V
WHT
RED
BLK
(CHASSIS)

【SERVO AMP BOARD】

Q・IC	
IC101	203 204 209 205 211 207 208 210 202 201 206 102 ICI02 101 106 ICI03 105 104 103
D	202 201,204 205 203

【SUB BOARD】 (NEW TYPE)

Q・IC	
IC701	701,702 704 705 703
IC702	704 711 714 706 717 712 713 709,708 710 715
IC703	
D	702,716 701 703 704 711 714 706 717 712 713 709,708 710 715

(FORMER TYPE) 【SUB BOARD】

Q・IC	
IC701	701 702 704 705 703
IC702	716 704 705 711 714 702 712 701 707 713 703 706 709,708 710 715
IC703	
D	716 702 701 703 704 705 711 714 712 713 707 706 709,708 710 715

【POWER BOARD】
T901 POWER TRANSFORMER
D603 C603 C604 C602 D601 D602 C601
VIO (AEP MODEL) RED (UK MODEL)
AC INPUT
RED (AEP MODEL) VIO (UK MODEL)
WHT
AEP, UK MODEL

D
603 602 601

T901
S901 VOLTAGE SELECTOR
220 — 240V
110 — 120V
RED BLK RED
YEL WHT ORG GRY BRN BLU
BRN
PINK
AC INPUT
E MODEL

STATOR (BSL MOTOR)
DENT : UP SIDE
H101, 102
CUTTING SIDE
DENT : UP SIDE
H401
CUTTING SIDE
【HALL SENSOR BOARD】
CUTTING SIDE
H401
RED WHT BLU YEL
H101 H102
CUTTING SIDE
TO PANEL LIFTER BRACKET (LEFT)
TO GUIDE (A)

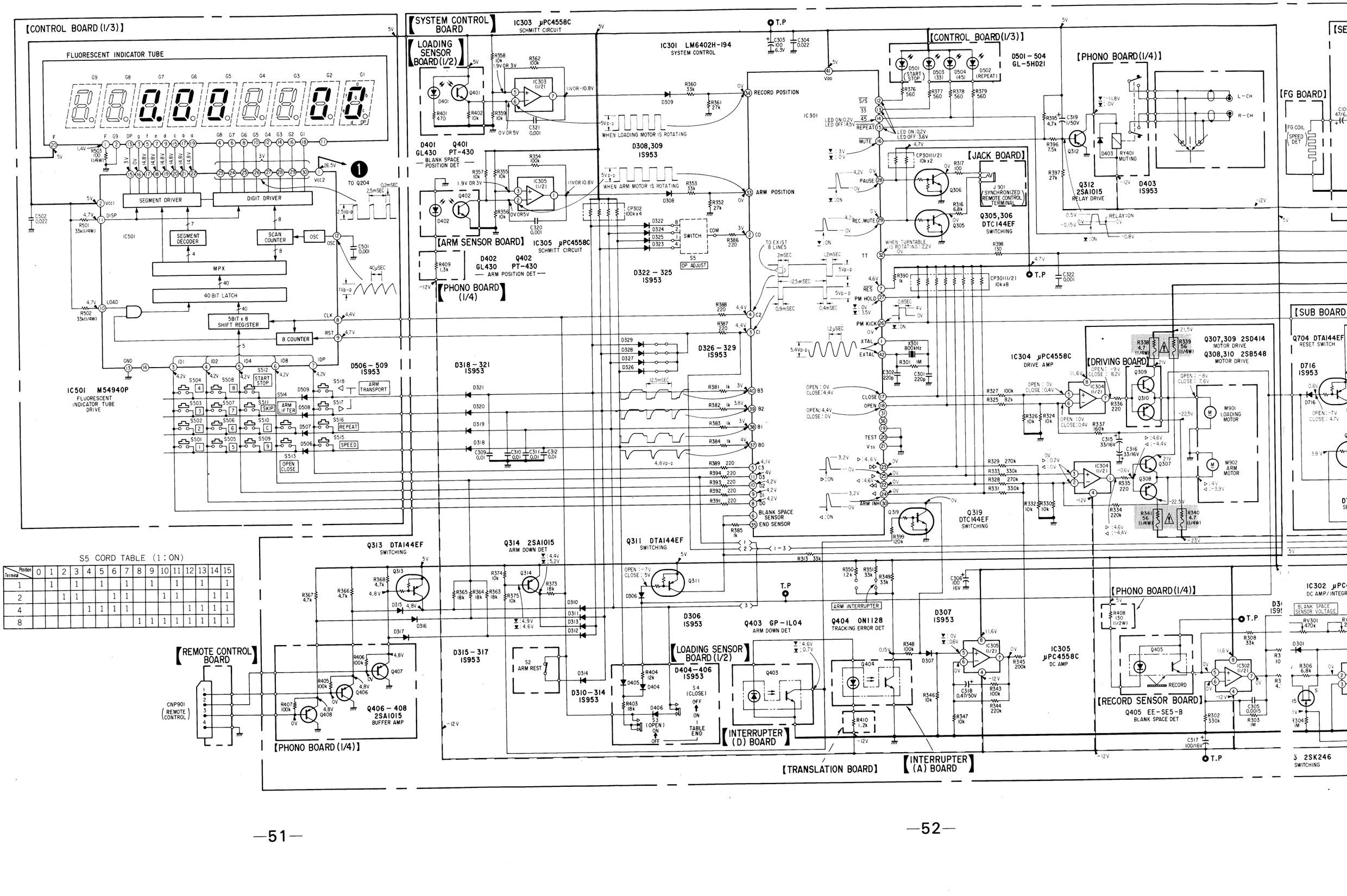
【TRANSLATION CIRCUIT BOARD】
【FG BOARD】
RED WHT
450mSEC (33rpm) 20Vp-p
450mSEC (33rpm) 18Vp-p

D	Q, IC
	IC401
411	412
410	
409	411
408	
407	
410, 409	

RED WHT YEL BLU
R417 R418 R419
IC401
R420 D411 R421 R425 R426
Q412
C403 C402 R427
D410 R422 D409 R424 R423
Q411 R415 R416
D408 R411
D407 R412 R414 R413
C401
RED WHT BLU YEL
CN401
*Q410 Q409

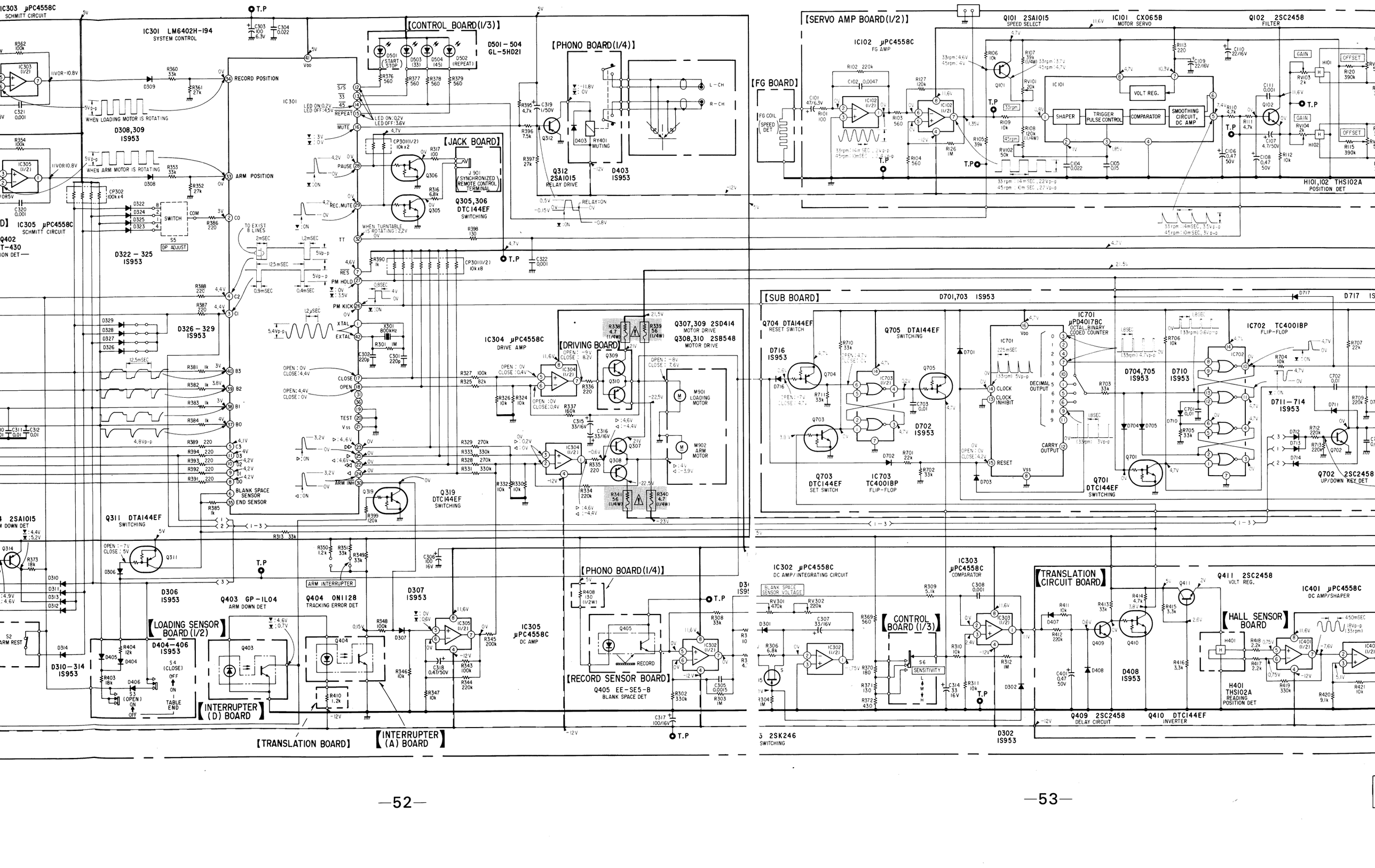
33rpm : 14mSEC, 22Vp-p
45rpm : 10mSEC, 22Vp-p
33rpm : 14mSEC, 2Vp-p
45rpm : 10mSEC, 2.4Vp-p
12.5 mSEC 0.4V 0V
5Vp-p WHEN ARM MOTOR ROTATING
1.8SEC (33rpm) 0.6Vp-p
OPEN : 0V CLOSE : 4.2V
225mSEC (33rpm) 5Vp-p
1.8SEC (33rpm) 4.7Vp-p
1.8SEC (33rpm) 3Vp-p
25mSEC 0.6V 0V
OPEN : −7V CLOSE : 4.7V
OPEN : 4.7V CLOSE : 0V
33rpm : 4.6V 45rpm : 4V
33rpm : 450mSEC, 5.4Vp-p 45rpm : 330mSEC, 5.8Vp-p
33rpm : 450mSEC, 4.6Vp-p 45rpm : 330mSEC, 5Vp-p
33rpm 14mSEC, 3.5Vp-p 45rpm 10mSEC, 3Vp-p
POWER ON 0.7V 0V −23V
45μSEC 1Vp-p
IC305 IC302 IC501

4-2. SCHEMATIC DIAGRAM

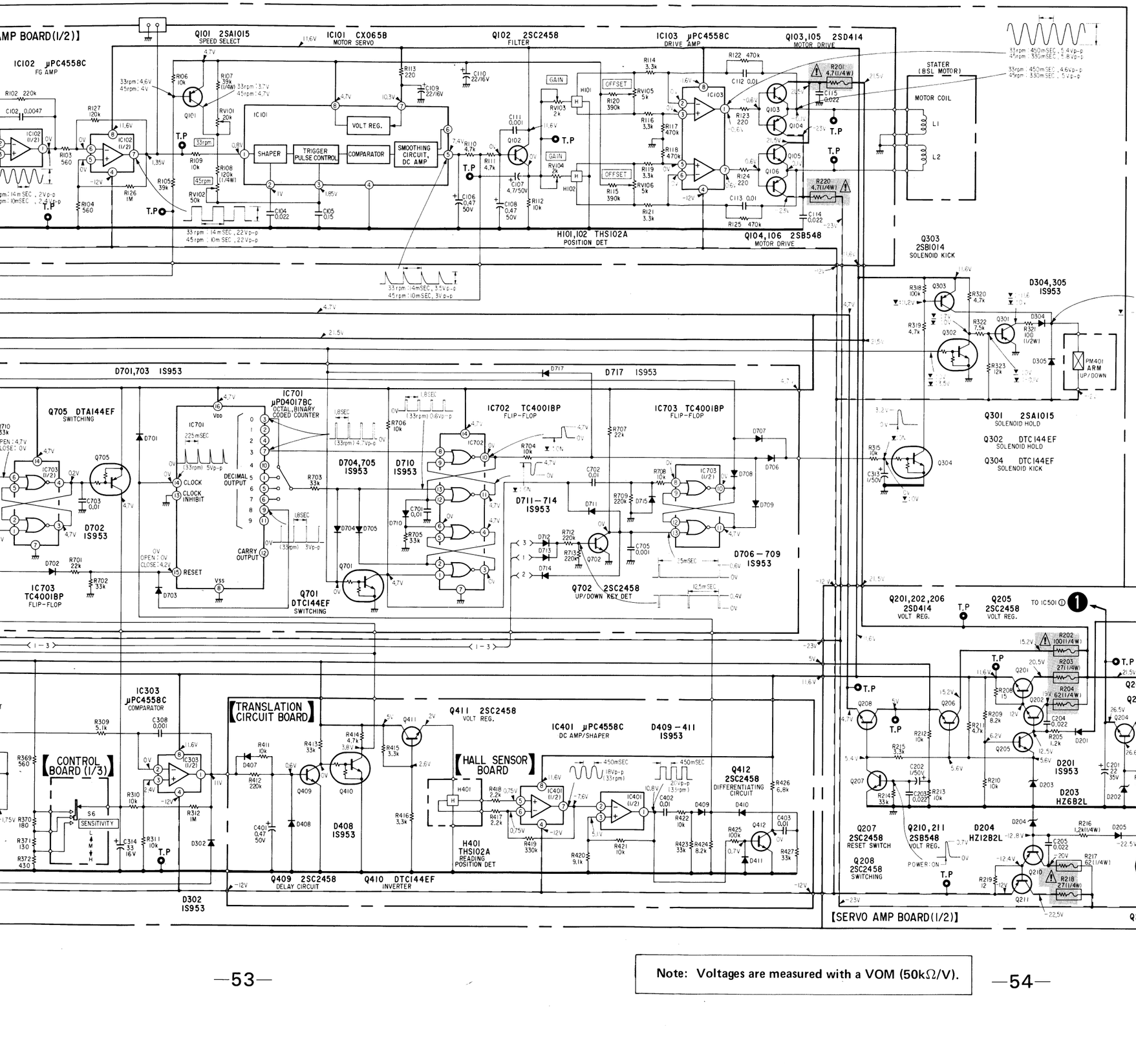


S5 CORD TABLE (1 : ON)

Position / Terminal	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1		1		1		1		1		1		1		1		1
2			1	1			1	1			1	1			1	1
4					1	1	1	1					1	1	1	1
8									1	1	1	1	1	1	1	1


IC303 μPC4558C
SCHMITT CIRCUIT
IC301 LM6402H-194
SYSTEM CONTROL
T.P
[CONTROL BOARD(1/3)]
D501 – 504
GL-5HD21
[PHONO BOARD(1/4)]
[SERVO AMP BOARD(1/2)]
Q101 2SA1015
SPEED SELECT
IC101 CX065B
MOTOR SERVO
Q102 2SC2458
FILTER
IC102 μPC4558C
FG AMP
[FG BOARD]
FG COIL
SPEED DET
VOLT REG.
SHAPER
TRIGGER PULSE CONTROL
COMPARATOR
SMOOTHING CIRCUIT, DC AMP
H101,102 THS102A
POSITION DET
RECORD POSITION
ARM POSITION
WHEN LOADING MOTOR IS ROTATING
WHEN ARM MOTOR IS ROTATING
D308,309
IS953
D322 – 325
IS953
D326 – 329
IS953
SWITCH
S5
DP ADJUST
TO EXIST 8 LINES
[JACK BOARD]
J 901
SYNCHRONIZED REMOTE CONTROL TERMINAL
Q305,306
DTC144EF
SWITCHING
Q312
2SA1015
RELAY DRIVE
D403
IS953
RY401
MUTING
L-CH
R-CH
LED ON:0.2V
LED OFF:4.5V
LED ON:0.2V
LED OFF:3.6V
PAUSE
REC.MUTE
WHEN TURNTABLE IS ROTATING : 2.2V
0V
TT
RES
PM HOLD
PM KICK
XTAL
EXTAL
TEST
Vss
ARM INH
IC304 μPC4558C
DRIVE AMP
[DRIVING BOARD]
Q307,309 2SD414
MOTOR DRIVE
Q308,310 2SB548
MOTOR DRIVE
M901
LOADING MOTOR
M902
ARM MOTOR
Q319
DTC144EF
SWITCHING
[SUB BOARD]
D701,703 IS953
Q704 DTA144EF
RESET SWITCH
Q705 DTA144EF
SWITCHING
D716
IS953
Q703
DTC144EF
SET SWITCH
IC703
TC4001BP
FLIP-FLOP
D702
IS953
IC701
μPD4017BC
OCTAL, BINARY CODED COUNTER
CLOCK
CLOCK INHIBIT
RESET
CARRY OUTPUT
DECIMAL OUTPUT
Q701
DTC144EF
SWITCHING
D704,705
IS953
D710
IS953
IC702 TC4001BP
FLIP-FLOP
D711 – 714
IS953
Q702 2SC2458
UP/DOWN KEY DET
Q311 DTA144EF
SWITCHING
D306
IS953
Q403 GP-IL04
ARM DOWN DET
[LOADING SENSOR BOARD (1/2)]
D404 – 406
IS953
S4 (CLOSE)
S3 (OPEN)
TABLE END
[INTERRUPTER (D) BOARD]
ARM INTERRUPTER
Q404 0N1128
TRACKING ERROR DET
D307
IS953
IC305 μPC4558C
DC AMP
D310 – 314
IS953
[INTERRUPTER (A) BOARD]
[TRANSLATION BOARD]
[PHONO BOARD(1/4)]
Q405
RECORD
[RECORD SENSOR BOARD]
Q405 EE-SE5-B
BLANK SPACE DET
IC302 μPC4558C
DC AMP/INTEGRATING CIRCUIT
BLANK SPACE SENSOR VOLTAGE
IC303 μPC4558C
COMPARATOR
[CONTROL BOARD (1/3)]
SENSITIVITY
[TRANSLATION CIRCUIT BOARD]
Q411 2SC2458
VOLT REG.
IC401 μPC4558C
DC AMP/SHAPER
[HALL SENSOR BOARD]
H401
THS102A
READING POSITION DET
Q409 2SC2458
DELAY CIRCUIT
Q410 DTC144EF
INVERTER
D408
IS953
D302
IS953
5 2SK246
SWITCHING

Q | R | S | T | U | V | W | X | Y | Z | A1 | B1 | C1 | D1 | E1 | F1 | G1



Note:

- All capacitors are in µF unless otherwise noted. pF : µµF 50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in ohms, 1/6 W unless otherwise noted. kΩ: 1000Ω, MΩ: 1000 kΩ
- : fusible resistor.
- , : transistor with resistor.
- : adjustment for repair.
- : B+ bus.
- : B- bus.
- Voltages are dc with respect to ground unless otherwise noted.
- Readings are taken under no-signal conditions with a VOM (50 kΩ/V).
  no mark: STOP
  OPEN : OPEN
  CLOSE : CLOSE
  ▼ : When tonearm lowers on manual play.
  ▼ : When tonearm lifts on manual play.
  ◁ : When tonearm moves inward on manual play.
  ▷ : When tonearm moves outward on manual play.
- Waveforms are taken with respect to ground with an oscilloscope.
- Switch

Ref. No.	Switch	Position
S1	POWER	OFF
S2	ARM REST	ON
S3	OPEN	OFF
S4	CLOSE	ON
S5	DP ADJUST	–
S6	SENSITIVITY	M
S501–509	FUNCTION	OFF
S510	C (CLEAR)	OFF
S511	SKIP	OFF
S512	START/STOP	OFF
S513	OPEN/CLOSE	OFF
S514	ARM LIFTER	OFF
S515	SPEED	OFF
S516	REPEAT	OFF
S517,518	ARM TRANSPORT (▷,◁)	OFF

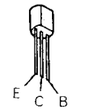
1 2 3 4 5 6 7 8 9 10

Note: Voltages are measured with a VOM (50kΩ/V).

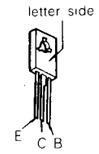
Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

- **Semiconductor Lead Layouts**

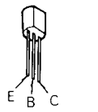
2SA1015
2SD1388



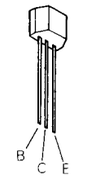
2SB548
2SD414



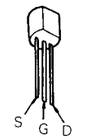
2SB1014



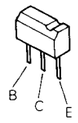
2SC2458



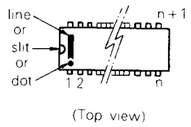
2SK246



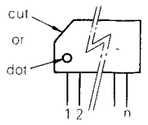
DTA144EF
DTC144EF



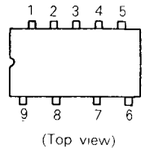
LM6402H-194
M54940P
μPC4558C
μPD4017BC



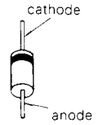
CX065B



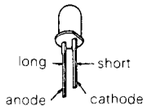
TC4001BP



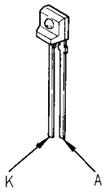
1S1555
10E2
HZ6B2L
HZ12B2L
HZ27-2L



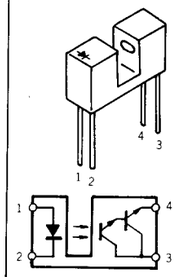
GL5HD21



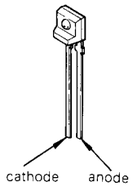
GL430



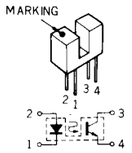
GP1L04



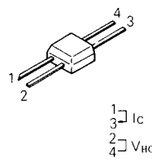
PT430



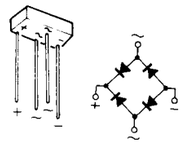
ON1128



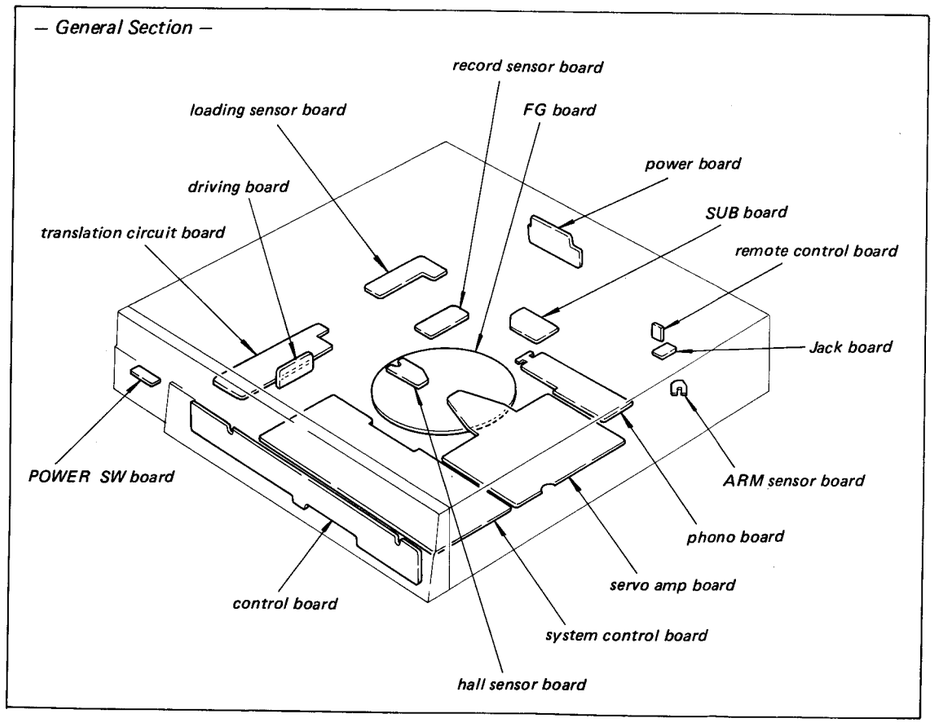
THS102A

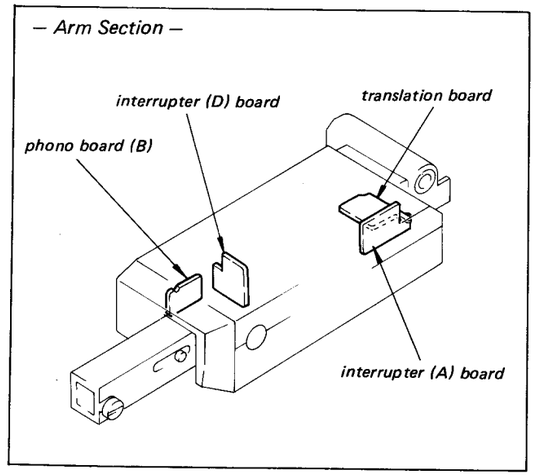


S1BA10



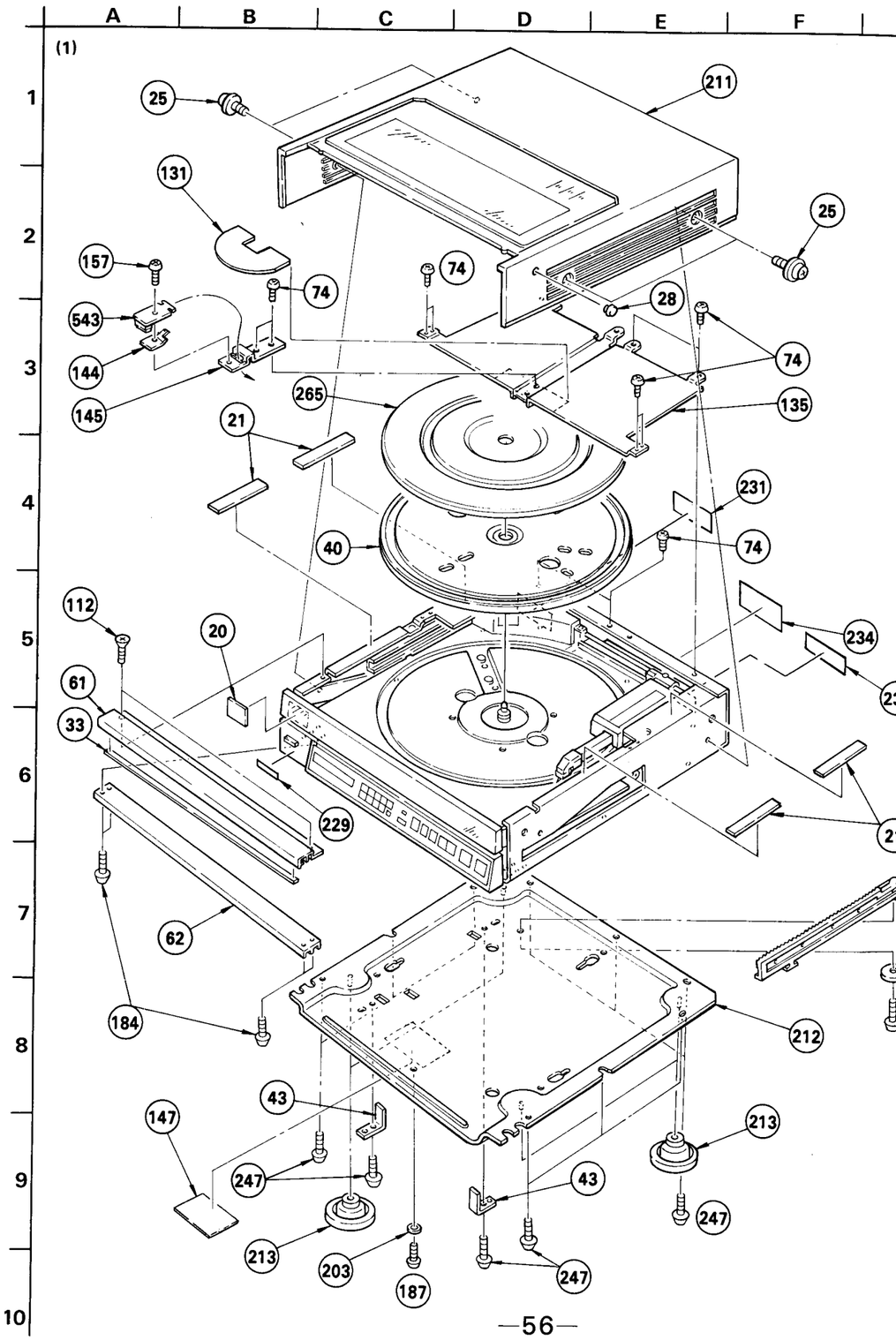
CIRCUIT BOARDS LOCATION



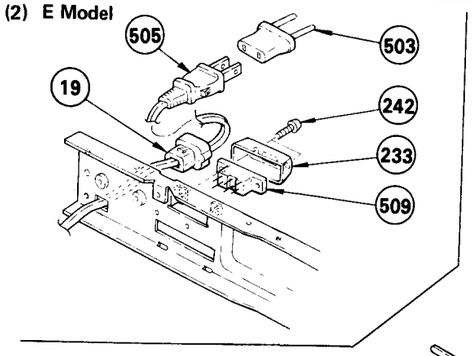


PS-FL99 PS-FL99

SECTION 5
EXPLODED VIEWS AND PARTS LIST



(2) E Model


505
503
19
242
233
509

T901
504
506
510
190
199
206
247
19
169
47
223
15
191
198
508
531
108
73
189
247
66
68
186
J901
67
507
532
533
111
183
64
243
203
189
65
110
209
56
47
169
227
110
12
168
183
46
226
168
189
48
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30
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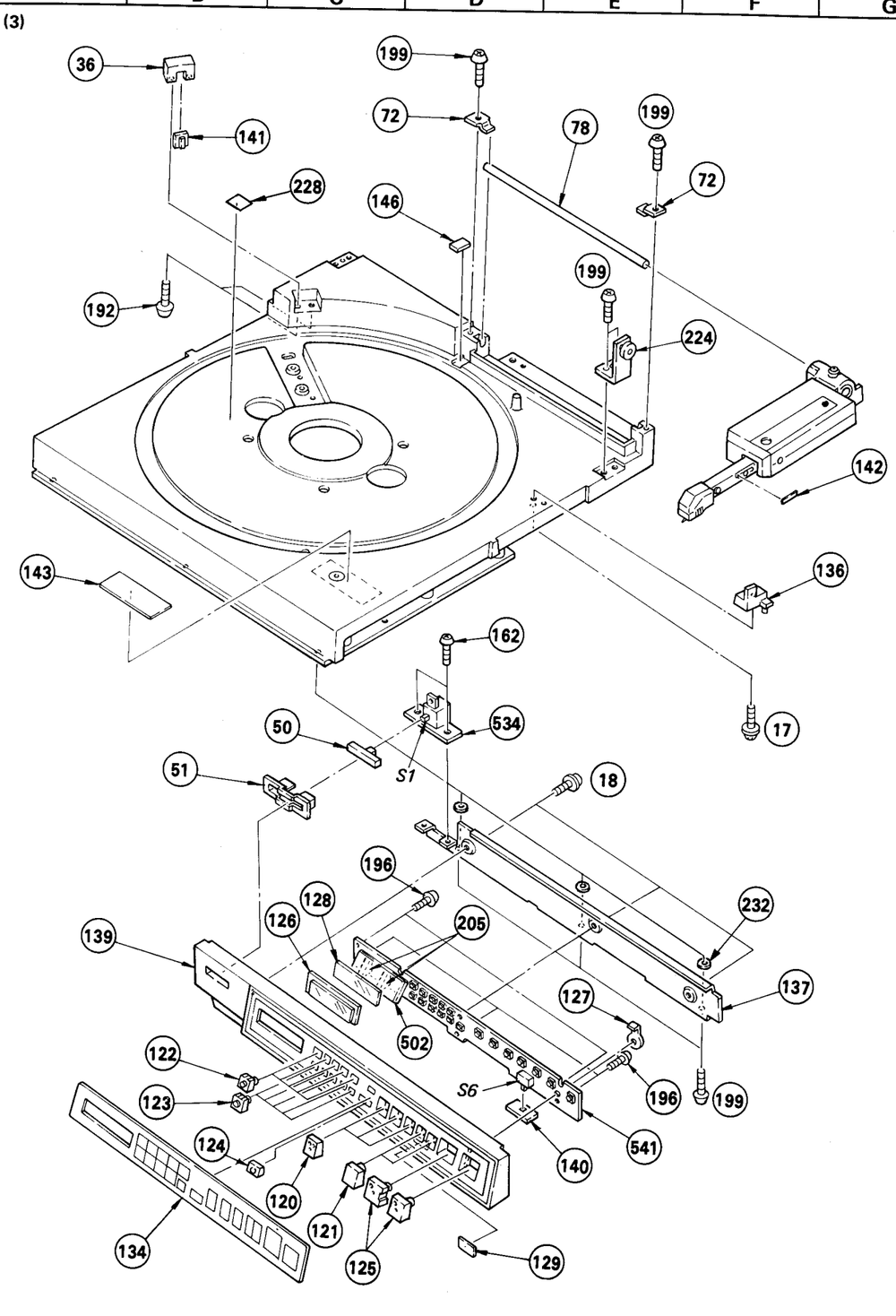
57
169
12
225
149
245
56
55

(3)


36
199
72
78
199
141
72
228
146
199
192
224
142
143
136
162
17
50
534
S1
51
18
196
128
126
205
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502
122
S6
196
199
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541
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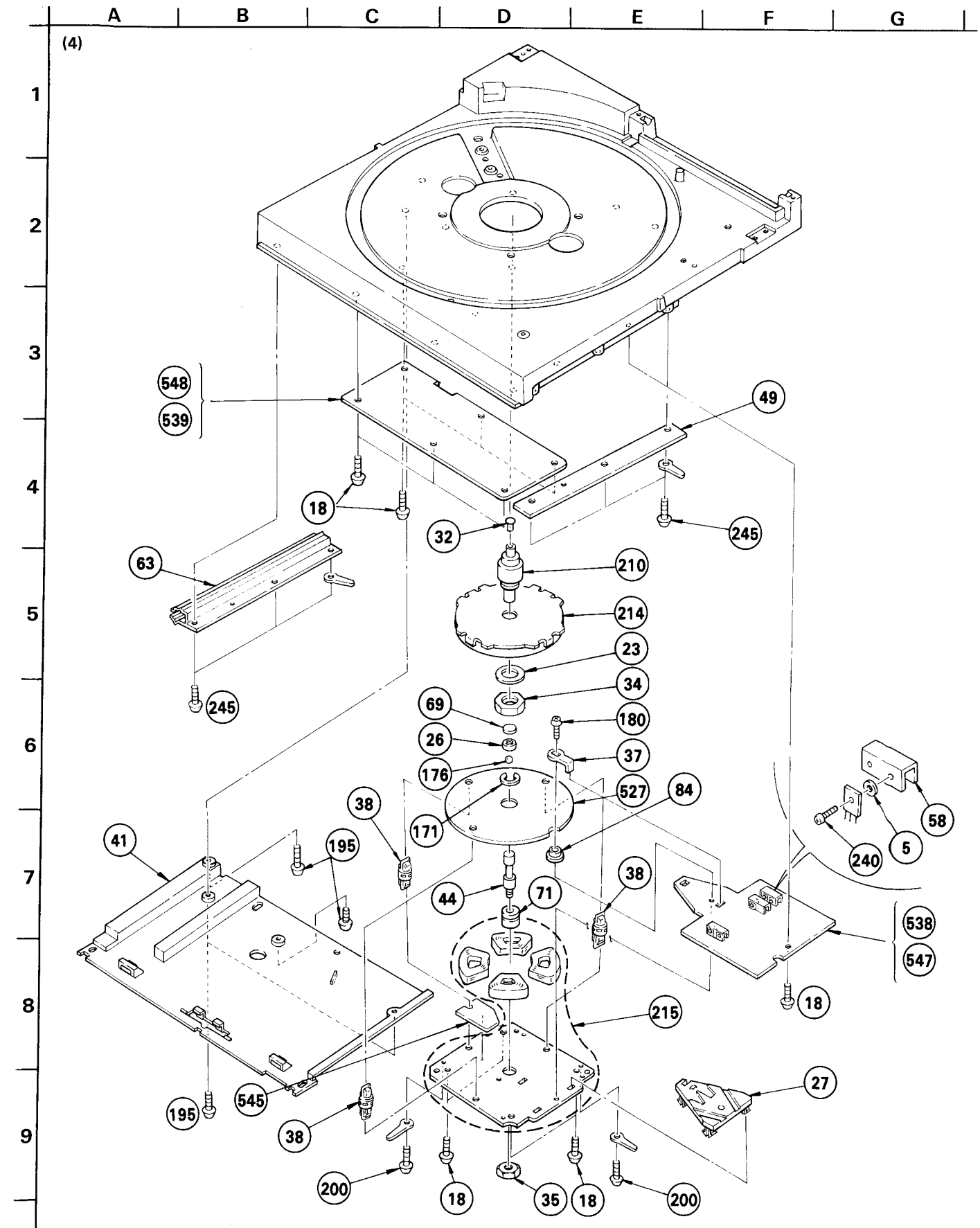
134
129


A
B
C
D
E
F
G
1
2
3
4
5
6
7
8
9
10
(4)
548
539
49
18
32
245
63
210
214
23
34
69
26
176
180
37
527
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171
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71
538
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58
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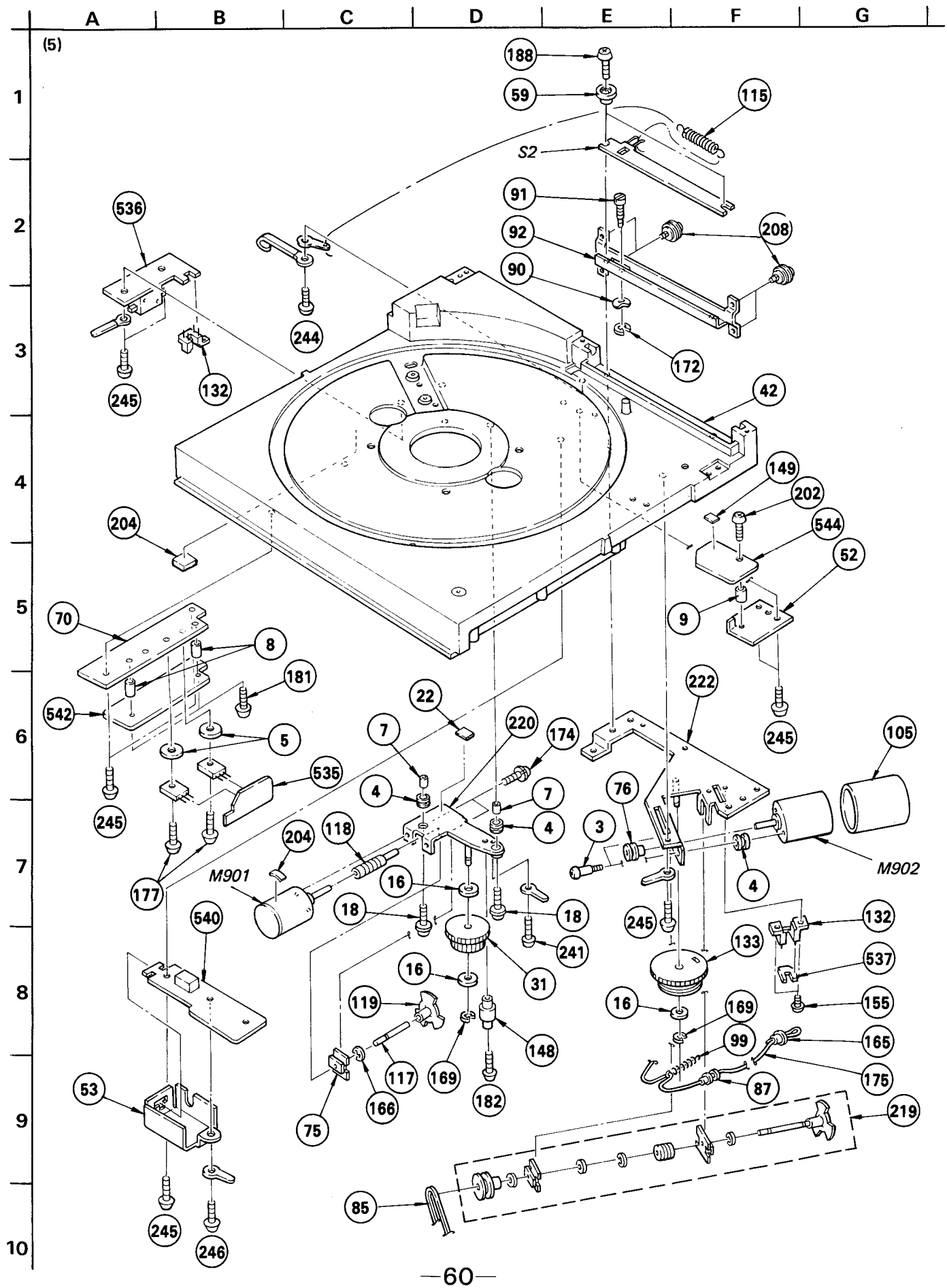
240
215
27
545
200
35


A
B
C
D
E
F
G
1
2
3
4
5
6
7
8
9
10
(5)
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115
S2
91
92
208
90
172
536
244
245
132
42
149
202
544
52
9
204
70
8
181
542
5
535
177
22
7
4
220
174
118
M901
16
18
241
31
540
53
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166
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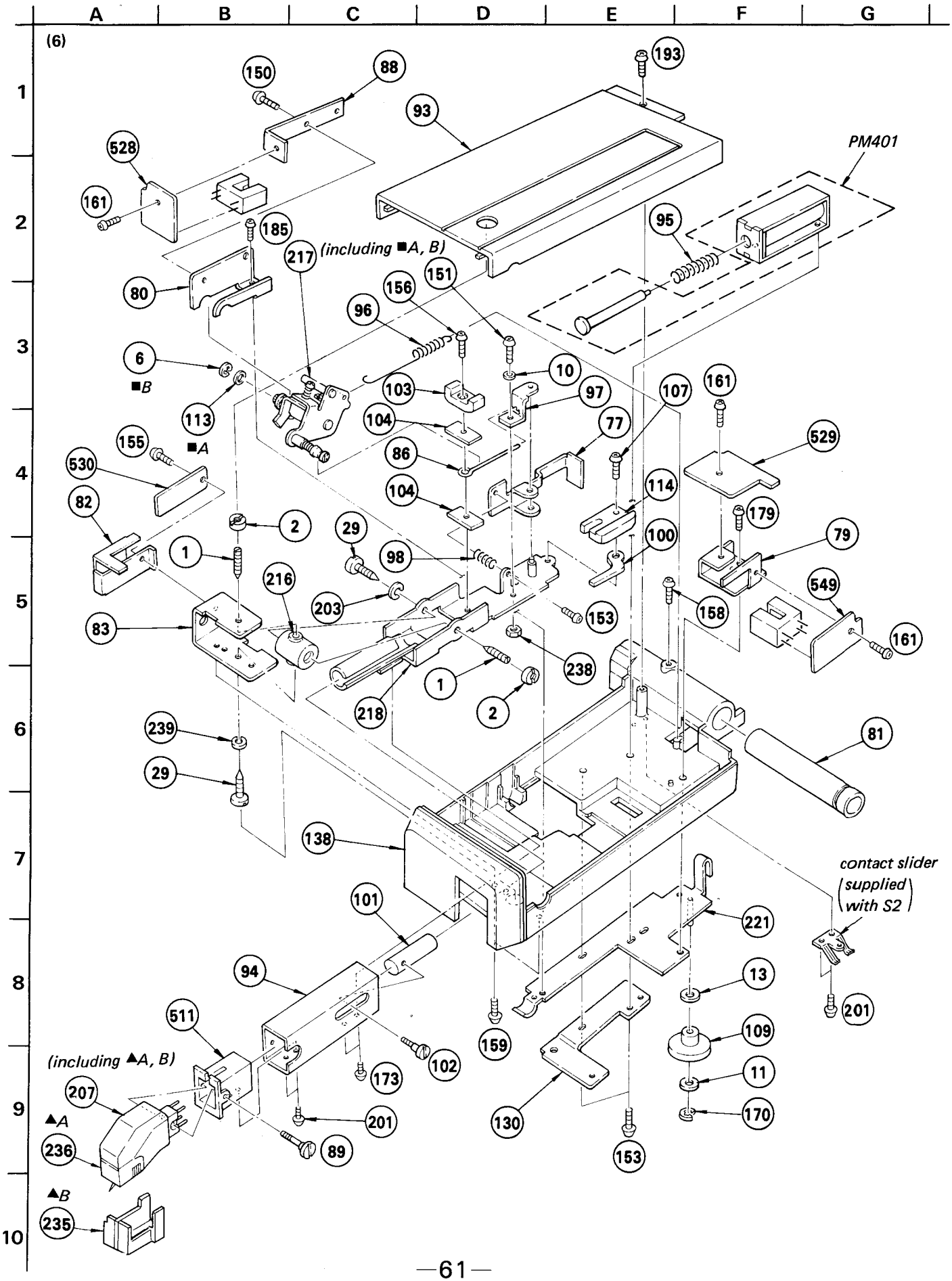
A
B
C
D
E
F
G
1
2
3
4
5
6
7
8
9
10
(6)
PM401
(including ■A, B)
■A
■B
(including ▲A, B)
▲A
▲B
contact slider
(supplied
with S2)
150
88
193
93
528
161
185
217
80
151
156
96
6
10
103
97
107
161
113
104
77
155
86
529
530
114
82
104
179
2
29
100
79
1
98
216
549
203
158
83
153
161
238
1
218
2
239
81
29
138
101
221
94
13
511
159
109
102
173
11
207
201
130
170
89
153
236
235
201

GENERAL SECTION

No.	Part No.	Description
1	2-203-518-61	SCREW, PIVOT
2	2-203-519-00	NUT (A), LOCK, PIVOT
3	3-570-027-00	SCREW, MOTOR
4	3-570-118-00	CUSHION, MOTOR
5	3-572-365-01	SHEET (A), INSULATING
6	3-618-189-00	RING, RETAINING
7 ♦	3-654-058-00	SPACER 3X3
8	3-654-603-00	SPACER
9	3-657-842-01	SPACER (3X4)
10	3-701-437-21	WASHER
11	3-701-439-11	WASHER
12	3-701-439-21	WASHER
13	3-701-440-11	WASHER, 3.5
14	.....	
15	3-701-441-11	WASHER
16	3-701-441-21	WASHER
17	3-703-135-00	SCREW, TAPPING
18	3-703-137-00	SCREW, TAPPING
19	3-703-244-00	(AEP,UK)...BUSHING, CORD
19	3-703-571-00	(E)....BUSHING (S), CORD
20	3-703-708-01	STICKER, SONY SYMBOL (18)
21	3-831-441-11	SHEET, PROTECTION
22	3-831-441-XX	CUSHION
23	3-849-306-00	WASHER (TELESCOPIC ANTENNA)
24	0-056-028-00	WASHER, PLAIN, 14 DIA.
25	4-820-330-51	SCREW, BW, PLUS MINUS
26	4-852-007-00	RETAINER (A), THRUST
27	4-857-642-00	HOLDER, PC BOARD
28	4-874-260-01	CAP, BLIND
29	4-877-816-00	SHAFT, PIVOT
30	4-879-509-00	ROLLER (A)
31	4-879-514-00	WHEEL (A), WORM
32 ♦	4-879-541-00	CAP, CENTER
33 ♦	4-879-624-11	PROTECTOR (F)
34	4-879-701-00	NUT, HEXAGON
35 ♦	4-879-758-00	NUT, SHAFT, MOTOR
36	4-879-775-21	HOLDER, LAMP
37 ♦	4-881-629-00	PLATE (A), GROUND
38	4-881-636-11	SUPPORT (TMD), PC
39	.....	
40	4-885-502-11	TURNTABLE
41 ♦	4-885-504-00	COVER, REAR
42	4-885-506-11	FRAME
43 ♦	4-885-509-00	PLATE, FUNCTION, LOADING SWITCH

GENERAL SECTION

No.	Part No.	Description
44 ♦	4-885-515-00	SHAFT, MOTOR
45 ♦	4-885-518-00	BRACKET (RIGHT), PANEL LIFTER
46 ♦	4-885-519-00	BRACKET (LEFT), PANEL LIFTER
47	4-885-520-00	ROLLER (A), GUIDE
48 ♦	4-885-524-00	SHAFT (C), GUIDE ROLLER
49 ♦	4-885-527-00	GUIDE (C)
50	4-885-531-00	KNOB, POWER
51	4-885-532-00	GUIDE, POWER KNOB
52 ♦	4-885-535-00	SUPPORT, TRANSPORT
53 ♦	4-885-549-00	PLATE, SHIELD
54 ♦	4-885-550-00	BRACKET (RIGHT), ROLLER
55	4-885-552-00	SPRING, TENSION
56	4-885-553-00	SPRING, TENSION
57 ♦	4-885-557-00	SHAFT (D), GUIDE ROLLER
58 ♦	4-885-562-00	HEAT SINK
59	4-885-563-00	COLLAR, ARM SWITCH
60	4-885-566-00	PLATE, RACK
61	4-885-567-00	PANEL, UPPER
62 ♦	4-885-568-00	REINFORCEMENT
63 ♦	4-885-571-02	GUIDE (A)
64 ♦	4-885-572-02	GUIDE (B)
65 ♦	4-885-580-00	PLATE (RIGHT), SIDE
66 ♦	4-885-581-00	PLATE (LEFT), SIDE
67 ♦	4-885-583-01	(AEP,UK)...PANEL, BACK
67 ♦	4-885-583-21	(E).....PANEL, BACK
68	4-885-584-00	TERMINAL BOARD, REMOTE CONTROL
69	4-885-589-00	WASHER, THRUST
70 ♦	4-885-590-00	HEAT SINK
71	4-885-591-00	SPACER, SHAFT, MOTOR
72 ♦	4-885-595-11	PLATE, FIXED, GUIDE BAR
73	4-885-597-00	SPRING, TENSION
74	4-885-599-00	SCREW, FITTING, REINFORCEMENT
75	4-885-703-00	GUIDE, WORM SHAFT
76	4-885-704-03	PULLEY, MOTOR
77	4-885-707-00	PLATE, ADJUSTMENT
78	4-885-709-00	BAR, GUIDE
79 ♦	4-885-710-00	BRACKET, PHOTO
80 ♦	4-885-712-00	RETAINER, PUSH ROD
81	4-885-717-00	SLIDER
82 ♦	4-885-718-00	PLATE, SHIELD
83 ♦	4-885-721-00	BRIDGE, ARM
84	4-885-727-00	SPACER
85	4-885-735-00	BELT, DRIVING
86	4-885-737-00	WIRE
87	4-885-744-00	STOPPER, WIRE
88 ♦	4-885-745-00	BRACKET (D), PHOTO

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- All resistors are in ohms.
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SEMICONDUCTORS

In each case, U : μ, for example:
UA···: μA···, UPA···: μPA···, UPC···: μPC,
UPD···: μPD···

GENERAL SECTION

No.	Part No.	Description
89	4-885-746-00	SCREW, FITTING, CARTRIDGE
90	4-885-747-00	WASHER (H)
91	4-885-748-00	PIN, ADJUSTMENT
92 ♦	4-885-750-00	GUIDE, ROLLER
93	4-885-753-02	COVER, ARM
94	4-885-760-02	PIPE, ARM
95	4-885-761-00	SPRING, COMPRESSION
96	4-885-762-00	SPRING, TENSION
97 ♦	4-885-765-00	RETAINER, WIRE
98	4-885-766-00	SPRING, COMPRESSION
99	4-885-767-00	SPRING, TENSION
100	4-885-768-00	WEIGHT (2)
101	4-885-770-00	WEIGHT, ADJUSTMENT
102	4-885-771-00	SCREW, ADJUSTMENT
103	4-885-773-00	WEIGHT (S)
104	4-885-774-00	BASE
105	4-885-775-00	CAP, MOTOR
106	.....	
107	4-885-799-00	SCREW, ADJUSTMENT
108 ♦	4-886-709-00	COLLAR, TERMINAL BOARD
109	4-886-714-00	ROLLER, GUIDE
110	4-886-719-00	SHEET, PROTECTION
111 ♦	4-888-958-00	COVER, INSULATING
112	4-886-722-00	SCREW, FITTING, UPPER PANEL
113	4-887-301-00	RETAINER, PUSH ROD
114	4-887-310-00	WEIGHT (A)
115	4-887-956-00	SPRING, TENSION
116	.....	
117	4-888-902-00	SHAFT (A), WORM
118	4-888-904-00	WORM (A)
119	4-888-905-00	DISK, SLIT
120 ♦	4-888-907-04	KNOB (S.R.A)
121 ♦	4-888-908-00	KNOB, TRANSPORT
122 ♦	4-888-909-00	KNOB (UPPER), PROGRAM
123 ♦	4-888-910-00	KNOB (LOWER), PROGRAM
124 ♦	4-888-911-00	KNOB, SKIP
125 ♦	4-888-912-00	KNOB (S.O)
126	4-888-913-00	PLATE, FROSTED
127 ♦	4-888-915-00	PLATE, GROUND, PANEL
128	4-888-917-00	SHEET, FROSTED
129	4-888-918-00	LABEL, SENSOR SELECTION
130 ♦	4-888-919-00	PLATE, FIXED, ARM
131 ♦	4-888-920-00	SHEET, SENSOR
132	4-888-922-00	COVER, PHOTO
133	4-888-923-11	WHEEL, WORM

GENERAL SECTION

No.	Part No.	Description
134	4-888-924-00	SHEET (A), CONTROL
135 ♦	4-888-926-02	REINFORCEMENT (UPPER)
136	4-888-927-00	REST, ARM
137 ♦	4-888-930-00	BRACKET (B), CONTROL PANEL
138	4-888-931-00	BASE, ARM
139	4-888-932-13	PANEL, CONTROL
140	4-888-933-00	PLATE, BLIND
141	4-888-934-00	WINDOW, LAMP
142	4-888-943-00	LABEL, STYLUS PRESSURE
143	4-888-944-00	LABEL, DP ADJ
144	4-888-945-00	SPRING, LEAF
145 ♦	4-888-946-00	BRACKET, SENSOR
146	4-888-948-00	SENSOR (M)
147 ♦	4-888-951-11	LABEL, SERVICE
148 ♦	4-888-952-00	GUIDE (A), RACK
149 ♦	4-888-954-00	PLATE, STOPPER
150	7-621-255-12	SCREW +P 2X3
151	7-621-255-22	SCREW +P 2X4
152	.....	
153	7-621-255-42	SCREW +P 2X6
154	.....	
155	7-621-259-25	SCREW +P 2.6X4
156	7-621-259-55	SCREW +P 2.6X8
157	7-621-284-10	SCREW +P 2.6X5
158	7-621-770-87	SCREW +P 2.6X5
159	7-621-772-08	SCREW +B 2X3
160	.....	
161	7-621-775-00	SCREW +B 2.6X3
162	7-621-775-10	SCREW +B 2.6X4
163	.....	
164	.....	
165	7-623-616-01	EYELET, 2X3
166	7-624-102-04	STOP RING 1.5, TYPE -E
167	.....	
168	7-624-105-04	STOP RING 2.3, TYPE -E
169	7-624-106-04	STOP RING 3.0, TYPE -E
170	7-624-133-04	STOP RING 3, TYPE-CE
171	7-624-133-94	STOP RING 15, TYPE-CE
172	7-624-190-81	STOP RING 2, TYPE-CS
173	7-627-553-37	SCREW, PRECISION +P 2X3
174	7-628-253-95	SCREW +PS 2.6X4
175	9-911-825-32	STRING, TETRON DIAL (0.3MM)
176	7-671-114-01	BALL 4, STEEL
177	7-682-146-01	SCREW +P 3X5
178	7-682-146-13	SCREW +P 3X5

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GENERAL SECTION

No.	Part No.	Description
179	7-682-147-09	SCREW +P 3X6
180	7-682-149-13	SCREW +P 3X10
181	7-682-151-01	SCREW +P 3X14
182	7-682-152-01	SCREW +P 3X16
183	7-682-245-09	SCREW +K 3X4
184	7-682-544-04	SCREW +B 3X3
185	7-682-544-09	SCREW +B 3X3
186	7-682-545-04	SCREW +B 3X4
187	7-682-546-04	SCREW +B 3X5
188	7-682-550-09	SCREW +B 3X12
189	7-682-646-01	SCREW +PS 3X5
190	7-682-947-01	SCREW +PSW 3X6
191	7-682-948-01	SCREW +PSW 3X8
192	7-685-134-11	SCREW +BTP 2.6X8 TYPE2 NON-SLIT
193	.....	
194	.....	
195	7-685-147-21	SCREW +P 3X10 TYPE2 SLIT
196	7-685-534-19	SCREW +BTP 2.6X8 TYPE2 N-S
197	.....	
198	7-685-545-14	SCREW +BTP 3X6 TYPE2 N-S
199	7-685-647-79	SCREW +BVTP 3X10 TYPE2 SLIT
200	7-685-750-01	SCREW +PTT 3X5 (S)
201	7-685-799-04	SCREW +PTT 1.7X2.5
202	7-685-872-01	SCREW +BVTT 3X8 (S)
203	7-688-003-11	W 3, MIDDLE
204	9-911-840-XX	CUSHION
205	9-911-847-XX	CUSHION
206	9-911-863-XX	(AEP)....SHEET (B), INSULATING
207	A-4505-089-A	CARTRIDGE ASSY (XL-250G)
208	X-3701-109-0	PULLEY ASSY
209 ♦	X-4885-505-0	BRACKET (LEFT) ASSY, ROLLER
210	X-4885-506-0	BEARING ASSY, MOTOR
211	X-4885-512-0	COVER ASSY, DUST
212 ♦	X-4885-513-0	PLATE ASSY, BOTTOM
213	X-4885-514-0	INSULATOR ASSY
214	X-4885-515-1	ROTOR ASSY
215	X-4885-516-1	STATOR ASSY
216	X-4885-711-0	HOLDER ASSY, BEARING
217	X-4885-714-1	LIFTER ASSY
218	X-4885-715-1	JOINT ASSY
219	X-4888-902-0	WORM ASSY
220 ♦	X-4888-903-0	BRACKET ASSY, GEAR, LOADING
221	X-4888-904-0	ROLLER ASSY (C), GUIDE
222 ♦	X-4888-905-0	BRACKET ASSY, MOTOR
223 ♦	X-4888-906-0	BRACKET (C) ASSY, GUIDE ROLLER

GENERAL SECTION

No.	Part No.	Description
224	X-4888-907-0	BRACKET (D) ASSY, GUIDE ROLLER
225 ♦	X-4888-908-0	LIFTER (RIGHT) ASSY, PANEL
226 ♦	X-4888-909-0	LIFTER (LEFT) ASSY, PANEL
227	X-4888-910-0	PANEL ASSY, FRONT
228	3-701-030-00	LABEL, SERIAL NUMBER
229 ♦	3-701-690-00	(UK)....LABEL (MADE IN JAPAN)
230	3-703-043-21	(UK)....LABEL, CAUTION, MAIN
231	3-703-396-00	(UK)....LABEL, CAUTION
232	4-830-092-00	WASHER, FIBER
233	4-886-724-00	(E)....COVER, SELECTION, VOLTAGE
234	4-888-935-00	(E).....LABEL, MODEL NUMBER
234	4-888-937-00	(AEP)...LABEL, MODEL NUMBER
234	4-888-938-00	(UK)....LABEL, MODEL NUMBER
235	2-231-652-00	COVER, STYLUS TIP
236	A-4587-071-B	STYLUS TIP (ND-250G)
237	7-621-255-22	SCREW +P 2X4
238	7-622-205-05	NUT, N2
239	7-623-208-22	WASHER, SW 3 TYPE2
240	7-628-146-00	SCREW +P 3X5
241	7-682-144-01	SCREW +P 3X3
242	7-682-547-09	SCREW +B 3X6
243	7-685-546-14	SCREW BTP 3X8
244	7-685-646-21	SCREW BVTP 3X8
245	7-687-647-21	SCREW BVTP 3X10
246	7-685-648-21	SCREW BVTP 3X12
247	7-685-870-01	SCREW BVTP 3X5

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ACCESSORY & PACKING MATERIAL

No.	Part No.	Description
251	3-532-616-00	BAG, POLYETHYLENE
252	3-701-630-00	BAG, POLYETHYLENE
253	3-701-634-00	BAG, POLYETHYLENE
254	3-701-806-00	ADAPTOR, 45, (E)
255	3-773-390-11	MANUAL, INSTRUCTION
256	3-795-664-11	INSTRUCTION
257	4-808-459-31	SCREW (B), MOTOR LOCK
258	4-879-799-00	PLATE (A), PROTECTION
259	4-885-533-00	LOCK (A), TRANSPORT
260	4-885-596-00	HOLDER, TURNTABLE
261	4-886-703-00	SCREW, TRANSPORT
262	4-886-710-00	SHEET, PROTECTION, DUST COVER
263	4-886-725-00	PROTECTOR
264	4-888-928-00	PLATE, TRANSPORT
265	4-888-929-02	SHEET, TURNTABLE
266	4-888-940-00	CUSHION (LEFT)
267	4-888-941-00	CUSHION (RIGHT)
268	4-888-942-00	SCREWDRIVER, ADJUSTMENT
269	4-888-950-00	INDIVIDUAL CARTON

ELECTRICAL PARTS

Ref.No.	Part No.	Description
501	♦;1-508-799-00	BASE POST (U TYPE)
502	1-519-291-00	INDICATOR TUBE, FLUORESCENT
503	1-526-565-00	(E1)...AC PLUG ADAPTOR
504	⚠.1-534-817-XX	(AEP)...CORD, POWER
505	⚠.1-551-472-00	(E).....CORD, POWER
506	⚠.1-556-562-00	(UK)....CORD, POWER
507	♦;1-535-116-00	TERMINAL
508	♦;1-535-416-00	TERMINAL
509	⚠.1-552-535-00	(E)....SWITCH, POWER & VOLTAGE CHANGE
510	1-556-242-00	CORD, CONNECTION
511	1-556-552-00	CONNECTOR (PLUG IN TYPE)
512	♦;1-560-039-00	PIN, CONNECTOR
513	♦;1-560-602-00	PIN, CONNECTOR 3P
514	.....	
515	♦;1-560-603-00	PIN, CONNECTOR 4P
516	.....	
517	.....	
518	♦;1-560-606-00	PIN, CONNECTOR 7P
519	♦;1-560-708-00	PIN, CONNECTOR 2P
520	.....	
521	.....	
522	♦;1-560-709-00	PIN, CONNECTOR 8P
523	♦;1-564-112-21	PIN, CONNECTOR 3P
524	♦;1-564-113-11	PIN, CONNECTOR 4P
525	♦;1-564-115-00	PIN, CONNECTOR 6P
526	♦;1-564-115-21	PIN, CONNECTOR 6P
527	♦;1-608-883-00	PC BOARD, FG
528	♦;1-609-688-00	PC BOARD, INTERRUPTER (D)
529	♦;1-610-177-00	PC BOARD, TRANSLATION
530	♦;1-610-178-00	PC BOARD, PHONO (B)
531	♦;1-610-247-00	PC BOARD, POWER
532	♦;1-610-248-00	PC BOARD, JACK
533	♦;1-610-249-00	PC BOARD, REMOTE CONTROL
534	♦;1-610-251-00	PC BOARD, POWER SW
535	♦;1-610-252-00	PC BOARD, DRIVING
536	♦;1-610-253-00	PC BOARD, LOADING SENSOR
537	♦;1-610-254-00	PC BOARD, AVM SENSOR
538	♦;1-610-255-00	PC BOARD, SERVO
539	♦;1-610-256-00	PC BOARD, SYSTEM CONTROL
540	♦;1-610-259-00	PC BOARD, PHONO
541	♦;1-610-287-00	PC BOARD, CONTROL
542	♦;1-610-414-00	PC BOARD, TRANSLATION
543	♦;1-610-415-00	PC BOARD, RECORD SENSOR
544	♦;1-610-559-00	PC BOARD, SUB
545	♦;1-610-560-00	PC BOARD, HOLE SENSOR

ELECTRICAL PARTS

Ref.No.	Part No.	Description			
546	A-4505-089-A	CARTRIDGE COMPLETE ASSY			
547	♦;A-4619-203-A	MOUNTED PCB, SERVO			
548	♦;A-4619-204-A	MOUNTED PCB, SYSTEM CONTROL			
549	1-608-815-00	PC BOARD, INTERRUPTER (A)			
C101	1-123-647-00	ELECT	47MF	20%	6.3V
C102	1-161-334-00	CERAMIC	0.0047MF	30%	50V
C104	1-161-494-00	CERAMIC	0.022MF	30%	25V
C105	1-130-885-00	FILM	0.15MF	5%	50V
C106	1-123-379-00	ELECT	0.47MF	20%	50V
C107	1-123-369-00	ELECT	4.7MF	20%	50V
C108	1-123-379-00	ELECT	0.47MF	20%	50V
C109	1-123-330-00	ELECT	22MF	20%	16V
C110	1-123-330-00	ELECT	22MF	20%	16V
C111	1-161-323-00	CERAMIC	0.001MF	10%	50V
C112	1-162-113-00	CERAMIC	0.01MF	30%	16V
C113	1-162-113-00	CERAMIC	0.01MF	30%	16V
C114	1-130-624-00	FILM	0.022MF	5%	50V
C115	1-130-624-00	FILM	0.022MF	5%	50V
C201	1-123-357-00	ELECT	22MF	20%	35V
C202	1-123-380-00	ELECT	1MF	20%	50V
C203	1-161-494-00	CERAMIC	0.022MF	30%	25V
C204	1-161-494-00	CERAMIC	0.022MF	30%	25V
C205	1-161-494-00	CERAMIC	0.022MF	30%	25V
C301	1-161-315-00	CERAMIC	220PF	10%	50V
C302	1-161-315-00	CERAMIC	220PF	10%	50V
C303	1-123-295-00	ELECT	100MF	20%	6.3V
C304	1-130-624-00	FILM	0.022MF	5%	50V
C305	1-161-053-00	CERAMIC	0.0015MF	30%	50V
C306	1-123-333-00	ELECT	100MF	20%	16V
C307	1-123-318-00	ELECT	33MF	20%	16V
C308	1-161-323-00	CERAMIC	0.001MF	10%	50V
C309	1-161-330-00	CERAMIC	0.01MF	30%	25V
C310	1-161-330-00	CERAMIC	0.01MF	30%	25V
C311	1-161-330-00	CERAMIC	0.01MF	30%	25V
C312	1-161-330-00	CERAMIC	0.01MF	30%	25V
C313	1-123-380-00	ELECT	1MF	20%	50V
C314	1-123-318-00	ELECT	33MF	20%	16V
C315	1-123-318-00	ELECT	33MF	20%	16V
C316	1-123-318-00	ELECT	33MF	20%	16V
C317	1-123-333-00	ELECT	100MF	20%	16V
C318	1-123-379-00	ELECT	0.47MF	20%	50V
C319	1-123-380-00	ELECT	1MF	20%	50V
C320	1-161-323-00	CERAMIC	0.001MF	10%	50V
C321	1-161-323-00	CERAMIC	0.001MF	10%	50V
C322	1-161-323-00	CERAMIC	0.001MF	10%	50V
C401	1-123-379-00	ELECT	0.47MF	20%	50V

ELECTRICAL PARTS

Ref.No.	Part No.	Description			
C402	1-161-330-00	CERAMIC	0.01MF	30%	25V
C403	1-161-330-00	CERAMIC	0.01MF	30%	25V
C501	1-161-323-00	CERAMIC	0.001MF	10%	50V
C502	1-101-005-00	CERAMIC	0.022MF		50V
C601	⚠.1-124-180-00	ELECT	33MF	20%	25V
C602	⚠.1-123-374-00	ELECT	100MF	20%	63V
C603	⚠.1-123-508-00	ELECT	1000MF	20%	35V
C604	⚠.1-123-508-00	ELECT	1000MF	20%	35V
C701	1-161-330-00	CERAMIC	0.01MF	30%	25V
C702	1-161-330-00	CERAMIC	0.01MF	30%	25V
C703	1-161-330-00	CERAMIC	0.01MF	30%	25V
C705	1-161-323-00	CERAMIC	0.001MF	10%	50V
D201	8-719-815-55	DIODE 1S1555			
D202	8-719-922-72	DIODE HZ27-2L			
D203	8-719-910-65	DIODE HZ6B2L			
D204	8-719-910-25	DIODE HZ12B2L			
D205	8-719-815055	DIODE 1S1555			
D301	8-719-815-55	DIODE 1S1555			
D302	8-719-815-55	DIODE 1S1555			
D304	8-719-815-55	DIODE 1S1555			
D305	8-719-815-55	DIODE 1S1555			
D306	8-719-815-55	DIODE 1S1555			
D307	8-719-815-55	DIODE 1S1555			
D308	8-719-815-55	DIODE 1S1555			
D309	8-719-815-55	DIODE 1S1555			
D310	8-719-815-55	DIODE 1S1555			
D311	8-719-815-55	DIODE 1S1555			
D312	8-719-815-55	DIODE 1S1555			
D313	8-719-815-55	DIODE 1S1555			
D314	8-719-815-55	DIODE 1S1555			
D315	8-719-815-55	DIODE 1S1555			
D316	8-719-815-55	DIODE 1S1555			
D317	8-719-815-55	DIODE 1S1555			
D318	8-719-815-55	DIODE 1S1555			
D319	8-719-815-55	DIODE 1S1555			
D320	8-719-815-55	DIODE 1S1555			
D321	8-719-815-55	DIODE 1S1555			
D322	8-719-815-55	DIODE 1S1555			
D323	8-719-815-55	DIODE 1S1555			
D324	8-719-815-55	DIODE 1S1555			
D325	8-719-815-55	DIODE 1S1555			
D326	8-719-815-55	DIODE 1S1555			
D327	8-719-815-55	DIODE 1S1555			
D328	8-719-815-55	DIODE 1S1555			
D329	8-719-815-55	DIODE 1S1555			

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- MMH : mH, UH : μH

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In each case, U : μ, for example:
UA···: μA···, UPA···: μPA···, UPC···: μPC,
UPD···: μPD···

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ELECTRICAL PARTS

Ref.No.	Part No.	Description
D401	8-719-902-96	DIODE GL-430
D402	8-719-902-96	DIODE GL-430
D403	8-719-815-55	DIODE 1S1555
D404	8-719-815-55	DIODE 1S1555
D405	8-719-815-55	DIODE 1S1555
D406	8-719-815-55	DIODE 1S1555
D407	8-719-815-55	DIODE 1S1555
D408	8-719-815-55	DIODE 1S1555
D409	8-719-815-55	DIODE 1S1555
D410	8-719-815-55	DIODE 1S1555
D411	8-719-815-55	DIODE 1S1555
D501	8-719-906-58	DIODE GL-5HD21
D502	8-719-906-58	DIODE GL-5HD21
D503	8-719-906-58	DIODE GL-5HD21
D504	8-719-906-58	DIODE GL-5HD21
D506	8-719-815-55	DIODE 1S1555
D507	8-719-815-55	DIODE 1S1555
D508	8-719-815-55	DIODE 1S1555
D509	8-719-815-55	DIODE 1S1555
D601 ⚠	8-719-200-02	DIODE 10E-2
D602 ⚠	8-719-200-02	DIODE 10E-2
D603 ⚠	8-719-510-01	DIODE S1RBA10
D701	8-719-815-55	DIODE 1S1555
D702	8-719-815-55	DIODE 1S1555
D703	8-719-815-55	DIODE 1S1555
D704	8-719-815-55	DIODE 1S1555
D705	8-719-815-55	DIODE 1S1555
D706	8-719-815-55	DIODE 1S1555
D707	8-719-815-55	DIODE 1S1555
D708	8-719-815-55	DIODE 1S1555
D709	8-719-815-55	DIODE 1S1555
D710	8-719-815-55	DIODE 1S1555
D711	8-719-815-55	DIODE 1S1555
D712	8-719-815-55	DIODE 1S1555
D713	8-719-815-55	DIODE 1S1555
D714	8-719-815-55	DIODE 1S1555
D715	8-719-815-55	DIODE 1S1555
D716	8-719-815-55	DIODE 1S1555
D717	8-719-815-55	DIODE 1S1555
H101	8-719-800-17	DIODE THS102A
H102	8-719-800-17	DIODE THS102A
H401	8-719-800-17	DIODE THS102A

ELECTRICAL PARTS

Ref.No.	Part No.	Description
IC101	8-759-602-65	IC CX-065B
IC102	8-759-145-58	IC UPC4558C
IC103	8-759-145-58	IC UPC4558C
IC301	8-759-800-22	IC LM6402H-194
IC302	8-759-145-58	IC UPC4558C
IC303	8-759-145-58	IC UPC4558C
IC304	8-759-145-58	IC UPC4558C
IC305	8-759-145-58	IC UPC4558C
IC401	8-759-145-58	IC UPC4558C
IC501	8-759-600-35	IC M54940P
IC701	8-759-140-17	IC UPD4017BC
IC702	8-759-240-01	IC TC4001BP
IC703	8-759-240-01	IC TC4001BP
J901	1-507-813-00	JACK
M901	1-541-219-00	MOTOR, LOADING
M902	1-541-218-00	MOTOR, ARM
PM401	1-454-344-00	SOLENOID, PLUNGER; ARM UP/DOWN
Q101	8-729-701-52	TRANSISTOR 2SA1025
Q102	8-729-245-83	TRANSISTOR 2SC2458
Q103	8-729-141-43	TRANSISTOR 2SD414
Q104	8-729-154-83	TRANSISTOR 2SB548
Q105	8-729-141-43	TRANSISTOR 2SD414
Q106	8-729-154-83	TRANSISTOR 2SB548
Q201	8-729-141-43	TRANSISTOR 2SD414
Q202	8-729-141-43	TRANSISTOR 2SD414
Q203	8-729-900-30	TRANSISTOR DTA144EF
Q204	8-729-802-34	TRANSISTOR 2SD1388
Q205	8-729-245-83	TRANSISTOR 2SC2458
Q206	8-729-141-43	TRANSISTOR 2SD414
Q207	8-729-245-83	TRANSISTOR 2SC2458
Q208	8-729-245-83	TRANSISTOR 2SC2458
Q209	8-729-900-33	TRANSISTOR DTC144EF
Q210	8-729-154-83	TRANSISTOR 2SB548
Q211	8-729-154-83	TRANSISTOR 2SB548
Q301	8-729-201-52	TRANSISTOR 2SA1015
Q302	8-729-900-33	TRANSISTOR DTC144EF
Q303	8-729-802-22	TRANSISTOR 2SB1014
Q304	8-729-900-33	TRANSISTOR DTC144EF
Q305	8-729-900-33	TRANSISTOR DTC144EF
Q306	8-729-900-33	TRANSISTOR DTC144EF
Q307	8-729-141-43	TRANSISTOR 2SD414
Q308	8-729-154-83	TRANSISTOR 2SB548
Q309	8-729-141-43	TRANSISTOR 2SD414
Q310	8-729-154-83	TRANSISTOR 2SB548

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ELECTRICAL PARTS

Ref.No.	Part No.	Description
Q311	8-729-900-30	TRANSISTOR DTA144EF
Q312	8-729-201-52	TRANSISTOR 2SA1015
Q313	8-729-900-30	TRANSISTOR DTA144EF
Q314	8-729-201-52	TRANSISTOR 2SA1015
Q315	8-729-224-61	TRANSISTOR 2SK246
Q319	8-729-900-33	TRANSISTOR DTC144EF
Q401	8-729-900-78	TRANSISTOR PT-430
Q402	8-729-900-78	TRANSISTOR PT-430
Q403	8-719-907-32	DIODE GP-1L04
Q404	8-719-411-28	DIODE ON1128
Q405	1-806-664-11	PHOTO COUPLER (REFLECTION TYPE)
Q406	8-729-201-53	TRANSISTOR 2SA1015
Q407	8-729-201-53	TRANSISTOR 2SA1015
Q408	8-729-201-53	TRANSISTOR 2SA1015
Q409	8-729-245-83	TRANSISTOR 2SC2458
Q410	8-729-900-33	TRANSISTOR DTC144EF
Q411	8-729-245-83	TRANSISTOR 2SC2458
Q412	8-729-245-83	TRANSISTOR 2SC2458
Q701	8-729-900-33	TRANSISTOR DTC144EF
Q702	8-729-245-83	TRANSISTOR 2SC2458
Q703	8-729-900-33	TRANSISTOR DTC144EF
Q704	8-729-900-33	TRANSISTOR DTC144EF
Q705	8-729-900-33	TRANSISTOR DTC144EF
R101	1-247-807-00	CARBON 100 5% 1/6W
R102	1-247-887-00	CARBON 220K 5% 1/6W
R103	1-247-825-00	CARBON 560 5% 1/6W
R104	1-247-825-00	CARBON 560 5% 1/6W
R105	1-247-869-00	CARBON 39K 5% 1/6W
R106	1-247-855-00	CARBON 10K 5% 1/6W
R107	1-214-767-00	METAL 39K 1% 1/4W
R108	1-214-779-00	METAL 120K 1% 1/4W
R109	1-247-855-00	CARBON 10K 5% 1/6W
R110	1-247-847-00	CARBON 4.7K 5% 1/6W
R111	1-247-847-00	CARBON 4.7K 5% 1/6W
R112	1-247-855-00	CARBON 10K 5% 1/6W
R113	1-247-815-00	CARBON 220 5% 1/6W
R114	1-247-843-00	CARBON 3.3K 5% 1/6W
R115	1-247-893-00	CARBON 390K 5% 1/6W
R116	1-247-843-00	CARBON 3.3K 5% 1/6W
R117	1-247-895-00	CARBON 470K 5% 1/6W
R118	1-247-895-00	CARBON 470K 5% 1/6W
R119	1-247-843-00	CARBON 3.3K 5% 1/6W
R120	1-247-893-00	CARBON 390K 5% 1/6W
R121	1-247-843-00	CARBON 3.3K 5% 1/6W

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R122	1-247-895-00	CARBON 470K 5% 1/6W
R123	1-247-815-00	CARBON 220 5% 1/6W
R124	1-247-815-00	CARBON 220 5% 1/6W
R125	1-247-895-00	CARBON 470K 5% 1/6W
R126	1-247-903-00	CARBON 1M 5% 1/6W
R127	1-247-881-00	CARBON 120K 5% 1/6W
R201 ⚠	1-212-849-00	FUSIBLE 4.7 5% 1/4W F
R202 ⚠	1-217-399-00	FUSIBLE 100 5% 1/4W F
R203 ⚠	1-212-867-00	FUSIBLE 27 5% 1/4W F
R204 ⚠	1-212-876-00	FUSIBLE 62 5% 1/4W F
R205	1-247-833-00	CARBON 1.2K 5% 1/6W
R206	1-247-783-00	CARBON 10 5% 1/6W
R207	1-247-855-00	CARBON 10K 5% 1/6W
R208	1-247-787-00	CARBON 15 5% 1/6W
R209	1-247-853-00	CARBON 8.2K 5% 1/6W
R210	1-247-855-00	CARBON 10K 5% 1/6W
R211	1-247-847-00	CARBON 4.7K 5% 1/6W
R212	1-247-855-00	CARBON 10K 5% 1/6W
R213	1-247-855-00	CARBON 10K 5% 1/6W
R214	1-247-867-00	CARBON 33K 5% 1/6W
R215	1-247-843-00	CARBON 3.3K 5% 1/6W
R216	1-246-475-00	CARBON 1.2K 5% 1/4W
R217 ⚠	1-212-876-00	FUSIBLE 62 5% 1/4W F
R218 ⚠	1-212-867-00	FUSIBLE 27 5% 1/4W F
R219	1-247-785-00	CARBON 12 5% 1/6W
R220 ⚠	1-212-849-00	FUSIBLE 4.7 5% 1/4W F
R301	1-247-903-00	CARBON 1M 5% 1/6W
R302	1-247-891-00	CARBON 330K 5% 1/6W
R303	1-247-903-00	CARBON 1M 5% 1/6W
R304	1-247-903-00	CARBON 1M 5% 1/6W
R305	1-247-847-00	CARBON 4.7K 5% 1/6W
R306	1-247-851-00	CARBON 6.8K 5% 1/6W
R307	1-247-807-00	CARBON 100 5% 1/6W
R308	1-247-867-00	CARBON 33K 5% 1/6W
R309	1-247-848-00	CARBON 5.1K 5% 1/6W
R310	1-247-855-00	CARBON 10K 5% 1/6W
R311	1-247-855-00	CARBON 10K 5% 1/6W
R312	1-247-903-00	CARBON 1M 5% 1/6W
R313	1-247-867-00	CARBON 33K 5% 1/6W
R315	1-247-855-00	CARBON 10K 5% 1/6W
R316	1-247-851-00	CARBON 6.8K 5% 1/6W
R317	1-247-807-00	CARBON 100 5% 1/6W
R318	1-247-879-00	CARBON 100K 5% 1/6W
R319	1-247-847-00	CARBON 4.7K 5% 1/6W
R320	1-247-847-00	CARBON 4.7K 5% 1/6W
R321	1-244-849-00	CARBON 100 5% 1/2W

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Ref.No.	Part No.	Description			
R322	1-247-852-00	CARBON	7.5K	5%	1/6W
R323	1-247-857-00	CARBON	12K	5%	1/6W
R324	1-247-855-00	CARBON	10K	5%	1/6W
R325	1-247-877-00	CARBON	82K	5%	1/6W
R326	1-247-855-00	CARBON	10K	5%	1/6W
R327	1-247-879-00	CARBON	100K	5%	1/6W
R328	1-247-889-00	CARBON	270K	5%	1/6W
R329	1-247-889-00	CARBON	270K	5%	1/6W
R330	1-247-855-00	CARBON	10K	5%	1/6W
R331	1-247-891-00	CARBON	330K	5%	1/6W
R332	1-247-855-00	CARBON	10K	5%	1/6W
R333	1-247-891-00	CARBON	330K	5%	1/6W
R334	1-247-887-00	CARBON	220K	5%	1/6W
R335	1-247-815-00	CARBON	220	5%	1/6W
R336	1-247-815-00	CARBON	220	5%	1/6W
R337	1-247-884-00	CARBON	160K	5%	1/6W
R338 ⚠	1-212-849-00	FUSIBLE	4.7	5%	1/4W F
R339 ⚠	1-212-875-00	FUSIBLE	56	5%	1/4W F
R340 ⚠	1-212-849-00	FUSIBLE	4.7	5%	1/4W F
R341 ⚠	1-212-875-00	FUSIBLE	56	5%	1/4W F
R343	1-247-879-00	CARBON	100K	5%	1/6W
R344	1-247-887-00	CARBON	220K	5%	1/6W
R345	1-247-887-00	CARBON	220K	5%	1/6W
R346	1-247-855-00	CARBON	10K	5%	1/6W
R347	1-247-855-00	CARBON	10K	5%	1/6W
R348	1-247-879-00	CARBON	100K	5%	1/6W
R349	1-247-867-00	CARBON	33K	5%	1/6W
R350	1-247-833-00	CARBON	1.2K	5%	1/6W
R351	1-247-867-00	CARBON	33K	5%	1/6W
R352	1-247-865-00	CARBON	27K	5%	1/6W
R353	1-247-867-00	CARBON	33K	5%	1/6W
R354	1-247-879-00	CARBON	100K	5%	1/6W
R355	1-247-855-00	CARBON	10K	5%	1/6W
R356	1-247-855-00	CARBON	10K	5%	1/6W
R357	1-247-855-00	CARBON	10K	5%	1/6W
R358	1-247-855-00	CARBON	10K	5%	1/6W
R359	1-247-855-00	CARBON	10K	5%	1/6W
R360	1-247-867-00	CARBON	33K	5%	1/6W
R361	1-247-865-00	CARBON	27K	5%	1/6W
R362	1-247-879-00	CARBON	100K	5%	1/6W
R363	1-247-861-00	CARBON	18K	5%	1/6W
R364	1-247-861-00	CARBON	18K	5%	1/6W
R365	1-247-861-00	CARBON	18K	5%	1/6W
R366	1-247-847-00	CARBON	4.7K	5%	1/6W
R367	1-247-847-00	CARBON	4.7K	5%	1/6W

ELECTRICAL PARTS

Ref.No.	Part No.	Description			
R368	1-247-847-00	CARBON	4.7K	5%	1/6W
R369	1-247-825-00	CARBON	560	5%	1/6W
R370	1-247-813-00	CARBON	180	5%	1/6W
R371	1-247-810-00	CARBON	130	5%	1/6W
R372	1-247-822-00	CARBON	430	5%	1/6W
R373	1-247-861-00	CARBON	18K	5%	1/6W
R374	1-247-855-00	CARBON	10K	5%	1/6W
R375	1-247-855-00	CARBON	10K	5%	1/6W
R376	1-247-825-00	CARBON	560	5%	1/6W
R377	1-247-825-00	CARBON	560	5%	1/6W
R378	1-247-825-00	CARBON	560	5%	1/6W
R379	1-247-825-00	CARBON	560	5%	1/6W
R381	1-247-831-00	CARBON	1K	5%	1/6W
R382	1-247-831-00	CARBON	1K	5%	1/6W
R383	1-247-831-00	CARBON	1K	5%	1/6W
R384	1-247-831-00	CARBON	1K	5%	1/6W
R385	1-247-831-00	CARBON	1K	5%	1/6W
R386	1-247-815-00	CARBON	1K	5%	1/6W
R387	1-247-815-00	CARBON	220	5%	1/6W
R388	1-247-815-00	CARBON	220	5%	1/6W
R389	1-247-815-00	CARBON	220	5%	1/6W
R390	1-247-831-00	CARBON	1K	5%	1/6W
R391	1-247-815-00	CARBON	220	5%	1/6W
R392	1-247-815-00	CARBON	220	5%	1/6W
R393	1-247-815-00	CARBON	220	5%	1/6W
R394	1-247-815-00	CARBON	220	5%	1/6W
R395	1-247-847-00	CARBON	4.7K	5%	1/6W
R396	1-247-852-00	CARBON	7.5K	5%	1/6W
R397	1-247-865-00	CARBON	27K	5%	1/6W
R398	1-247-810-00	CARBON	130	5%	1/6W
R399	1-247-881-00	CARBON	120K	5%	1/6W
R401	1-247-823-00	CARBON	470	5%	1/6W
R402	1-247-855-00	CARBON	10K	5%	1/6W
R403	1-247-861-00	CARBON	18K	5%	1/6W
R404	1-247-857-00	CARBON	12K	5%	1/6W
R405	1-247-879-00	CARBON	100K	5%	1/6W
R406	1-247-879-00	CARBON	100K	5%	1/6W
R407	1-247-879-00	CARBON	100K	5%	1/6W
R408	1-244-852-00	CARBON	130	5%	1/2W
R409	1-247-834-00	CARBON	1.3K	5%	1/6W
R410	1-247-833-00	CARBON	1.2K	5%	1/6W
R411	1-247-855-00	CARBON	10K	5%	1/6W
R412	1-247-887-00	CARBON	220K	5%	1/6W
R413	1-247-867-00	CARBON	33K	5%	1/6W
R414	1-247-847-00	CARBON	4.7K	5%	1/6W

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CAPACITORS:
MF:μF, PF:μμF.

RESISTORS
- All resistors are in ohms.
- F : nonflammable

COILS
- MMH : mH, UH : μH

SEMICONDUCTORS
In each case, U : μ, for example:
UA···: μA···, UPA···: μPA···, UPC···: μPC,
UPD···: μPD···

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ELECTRICAL PARTS

Ref.No.	Part No.	Description			
R415	1-247-843-00	CARBON	3.3K	5%	1/6W
R416	1-247-843-00	CARBON	3.3K	5%	1/6W
R417	1-247-839-00	CARBON	2.2K	5%	1/6W
R418	1-247-839-00	CARBON	2.2K	5%	1/6W
R419	1-247-891-00	CARBON	330K	5%	1/6W
R420	1-247-854-00	CARBON	9.1K	5%	1/6W
R421	1-247-855-00	CARBON	10K	5%	1/6W
R422	1-247-855-00	CARBON	10K	5%	1/6W
R423	1-247-867-00	CARBON	33K	5%	1/6W
R424	1-247-853-00	CARBON	8.2K	5%	1/6W
R425	1-247-879-00	CARBON	100K	5%	1/6W
R426	1-247-851-00	CARBON	6.8K	5%	1/6W
R427	1-247-867-00	CARBON	33K	5%	1/6W
R501	1-246-509-00	CARBON	33K	5%	1/4W
R502	1-246-509-00	CARBON	33K	5%	1/4W
R503	1-246-449-00	CARBON	100	5%	1/4W
R701	1-247-863-00	CARBON	22K	5%	1/6W
R702	1-247-867-00	CARBON	33K	5%	1/6W
R703	1-247-867-00	CARBON	33K	5%	1/6W
R704	1-247-855-00	CARBON	10K	5%	1/6W
R705	1-247-867-00	CARBON	33K	5%	1/6W
R706	1-247-855-00	CARBON	10K	5%	1/6W
R707	1-247-863-00	CARBON	22K	5%	1/6W
R708	1-247-855-00	CARBON	10K	5%	1/6W
R709	1-247-887-00	CARBON	220K	5%	1/6W
R710	1-247-867-00	CARBON	33K	5%	1/6W
R711	1-247-867-00	CARBON	33K	5%	1/6W
R712	1-247-887-00	CARBON	220K	5%	1/6W
R713	1-247-887-00	CARBON	220K	5%	1/6W
RV101	1-228-238-00	RES, ADJ, METAL GLAZE 20K			
RV102	1-228-239-00	RES, ADJ, METAL GLAZE 50K			
RV103	1-226-234-00	RES, ADJ, CARBON 2K			
RV104	1-226-234-00	RES, ADJ, CARBON 2K			
RV105	1-226-235-00	RES, ADJ, CARBON 5K			
RV106	1-226-235-00	RES, ADJ, CARBON 5K			
RV301	1-224-134-XX	RES, ADJ, METAL GLAZE 470K			
RV302	1-224-256-XX	RES, ADJ, METAL GLAZE 220K			
RY401	1-515-323-00	RELAY			

ELECTRICAL PARTS

Ref.No.	Part No.	Description
S1	1-553-909-00	SWITCH, PUSH, POWER
S2	1-554-483-00	SWITCH, ARM REST
S3	1-554-205-00	SWITCH, PUSH, OPEN
S4	1-554-205-00	SWITCH, PUSH, CLOSE
S5	1-553-324-00	SWITCH, ROTARY, DP ADJUST
S6	1-552-915-00	SWITCH, SLIDE, SENSITIVITY
S501	1-554-303-00	SWITCH, KEY BOARD
S502	1-554-303-00	SWITCH, KEY BOARD
S503	1-554-303-00	SWITCH, KEY BOARD
S504	1-554-303-00	SWITCH, KEY BOARD
S505	1-554-303-00	SWITCH, KEY BOARD
S506	1-554-303-00	SWITCH, KEY BOARD
S507	1-554-303-00	SWITCH, KEY BOARD
S508	1-554-303-00	SWITCH, KEY BOARD
S509	1-554-303-00	SWITCH, KEY BOARD
S510	1-554-303-00	SWITCH, KEY BOARD
S511	1-554-303-00	SWITCH, KEY BOARD
S512	1-554-303-00	SWITCH, KEY BOARD
S513	1-554-303-00	SWITCH, KEY BOARD
S514	1-554-303-00	SWITCH, KEY BOARD
S515	1-554-303-00	SWITCH, KEY BOARD
S516	1-554-303-00	SWITCH, KEY BOARD
S517	1-554-303-00	SWITCH, KEY BOARD
S518	1-554-303-00	SWITCH, KEY BOARD
T901 ⚠	1-446-851-00	(E).....TRANSFORMER, POWER
T901 ⚠	1-447-124-00	(AEP,UK)...TRANSFORMER, POWER
X301	1-527-895-00	OSCILLATOR, CERAMIC

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